THE FOUNDRY

FIFTIETH YEAR

What a DIVIDEND!

"Yes sir! . . . This muskie is another dividend I can credit to that new Milwaukee Jolt Rollover Draw machine. It certainly solved my foundry problems . . . and what's more, it permitted me to go fishing."

RIGHT Equipment PAYS!

TECHNOLOGY DEPT.

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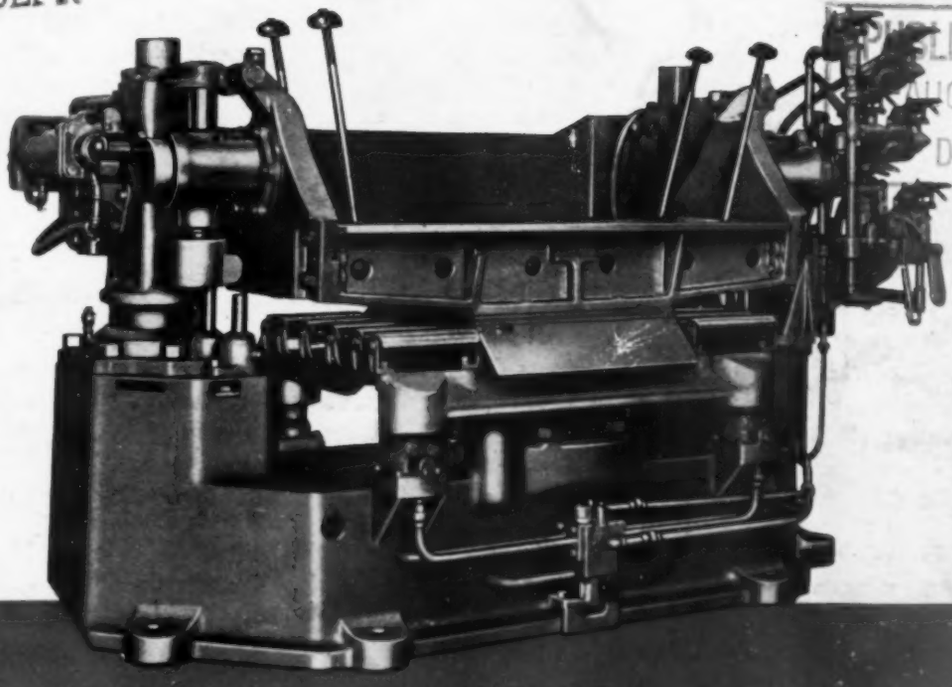

MILWAUKEE
JOLT
ROLLOVER
DRAW

MILWAUKEE FOUNDRY EQUIPMENT COMPANY

3229 WEST PIERCE STREET • MILWAUKEE, WISCONSIN, U. S. A.

A PIONEER THEN—

A LEADER TODAY

IN 1892, in a Virginia valley noted for its vast deposits of pure salt, Mathieson began the construction of the first of three great factories. Over a period of half a century, they were to supply America's growing industries with vital chemicals. Today—fifty years later—the Mathieson plants at Saltville, Va., Niagara Falls, N.Y. and Lake Charles, La., are working twenty-four hours a day to supply the nation's *war* industries with the "raw materials of victory."

This is the over-all picture of a typically American enterprise—The Mathieson Alkali Works. It is a story of growth and progress in chemical research...in developing new products, such as Purite . . . and in devising more efficient methods of applying and handling alkalies.

Among Mathieson's early achievements was the development of the Castner electrolytic cell for producing chlorine and extremely pure caustic soda. The first to make bleaching powder in the United States, Mathieson pioneered the manufacture of synthetic ammonia, liquid chlorine and such outstanding chlorine products as calcium hypochlorite and sodium chlorite. Chlorine, today in great demand for war production, is also safeguarding the health of our fighting men on all fronts as calcium hypochlorite, the *mobile* chlorine carrier.

These are but a few milestones in the fifty years of Mathieson Chemicals. They are tangible evidence of the drive and initiative which have marked Mathieson's rise from modest beginnings to a place of leadership in the field of industrial chemicals.

MATHIESON CHEMICALS

PURITE

CELEBRATING 50 YEARS OF SERVICE TO AMERICAN INDUSTRY AND PUBLIC HEALTH

The Mathieson Alkali Works, (Inc.) **60 East 42nd Street, New York, N Y.**

STEEL SCRAP *needed NOW*

TO KEEP WAR MATERIALS MOVING

Iron and steel scrap is used in enormous quantities in making new steel. The steel industry is now in urgent need of scrap to keep the mills operating—to keep war materials moving steadily to American fighting forces and to our Allies.

It is of vital importance to everyone to see that all iron and steel scrap is salvaged now and sent on its way to the mills. Your contribution—much or little—is needed now to secure the total scrap tonnage required to prevent a drop in production.

This appeal is not for ourselves alone. Much of the scrap you contribute will be allocated by the Government to be used wherever it is needed the most.

Salvage Anything Made of Steel or Iron

Manufacturing plants of all kinds are in a position to be of real assistance in relieving the present scrap shortage. Anything made of iron or steel is valuable as scrap—broken or wornout parts of machinery, steel-work from dismantled buildings, old boilers, obsolete dies, pipe. Comb your plant and warehouses for such material.

Time is short. The need is urgent. Put your scrap to work for your country—*now!*

WHAT TO DO WITH IT

To get your scrap on its way to the steel mills, sell it to a junk dealer, or get in touch with your local Industrial Salvage Committee. Many organizations have appointed someone to be in charge of salvage—someone who has authority to order the scrapping of material not in actual use, or material which will go out of use in the near future. In this way, available scrap can be located and disposed of most efficiently.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

IT ALL FITS INTO A PERFECT PATTERN

FROM OUR NEW VENTILATED WAREHOUSE...

...FROM BINS OF CONTROLLED HUMIDITY...

Photo Courtesy Foote-Burt Co.

...TO YOUR PATTERN SHOP!

● Every skilled pattern maker knows that a casting is only as good as its pattern. That's why they insist upon properly conditioned, even-grained lumber for all pattern jobs.

Good PATTERN LUMBER is more than a specialty, it's a hobby! Dougherty carries complete stocks of carefully cured pattern lumber at all times. Grade includes Northern Cork White Pine, California Sugar Pine, Idaho White Pine and Honduras Mahogany...in thicknesses varying from 3/8" to 4". Average moisture content is around 6%.

So, for wood that compliments the pattern maker's art...wood that is *guaranteed* to give complete satisfaction . . . call Dougherty *first!* You'll be glad you did!

FLASK LUMBER ALSO AVAILABLE

★

PATTERN LUMBER BUYERS!

The recent "freeze" order on certain lumber stocks does not effect our Pattern and Flask Lumber inventory. You can still get all you need. So we suggest you order *now*, while the "getting's good".

★

"INDUSTRY'S HEADQUARTERS FOR LUMBER PRODUCTS"

The DOUGHERTY LUMBER Co.

4300 EAST 68TH ST. DI 1200 CLEVELAND, OHIO

1053 EAST 152ND ST. 12100 EUCLID AVE.

THE FOUNDRY

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Dry Sand Molds

DON'T cast excess iron at critical points, later to be machined off. Machine tools are scarce and so are good men to run them. Dry sand cores in many places can take the place of green sand molds and practically eliminate machine finishing. You do not have to allow for warpage with oil sand and there is less danger of washing sand loose and floating it to some undesired spot. While first costs may be higher the advantages of speed, safety, and precision are important. For sure results use

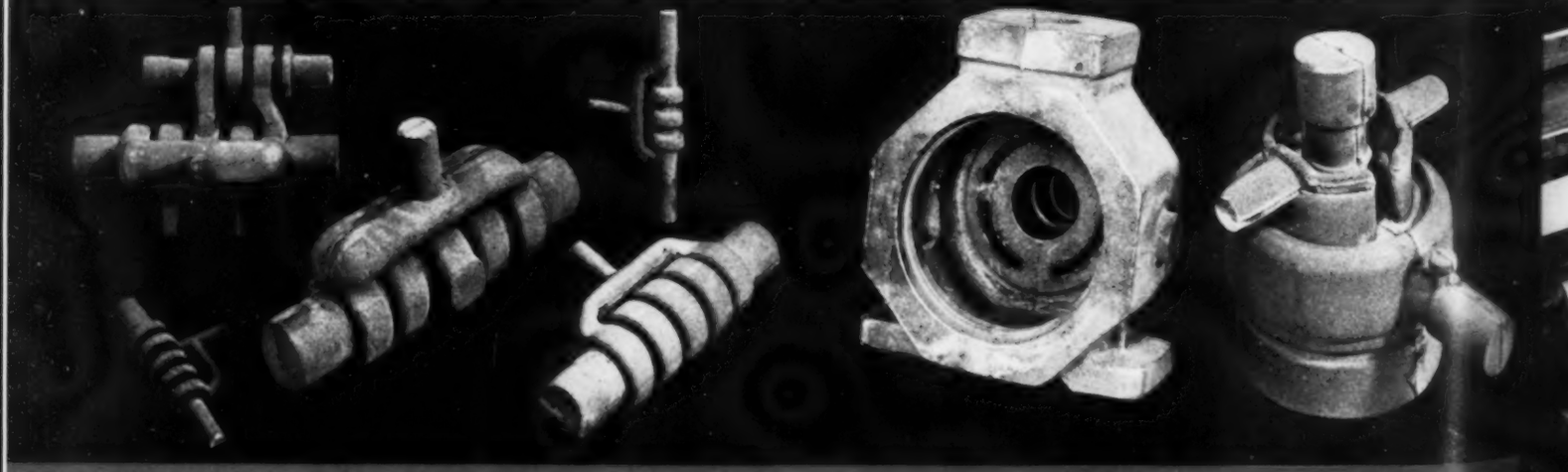
LINOIL

In the American Skein and Foundry Co., Racine, Wis., where the pictures shown here were taken, it is Linoil all the way. From small intricate cores weighing only ounces or pounds up to the massive cores and mold sections weighing tons Linoil is the oil used.

"We have used Linoil for years," says Ray J. Kelly, superintendent, "We use it because of its binding strength and its uniform quality. We *do* get more tons of cores per drum."

Shown in the pictures are milling machine bases weighing a ton and taking a ton of cores, hydraulic pumps that work under 1,000 to 3,000 pounds pressure, hydraulic valves with intricate small cores, hydraulic power take-offs with blades 1/8th" thick, milling machine tables saddles and bases, and power hack saws.

Linoil is the friend of busy foundrymen because it is so dependable, so efficient, and so economical. Linoil gives you the minimum amount of oil in your sand which makes for free venting, quick baking, and fewer gas blows. Linoil gives great speed in the cleaning room, and is an all around grand oil. Send for the Linoil man.



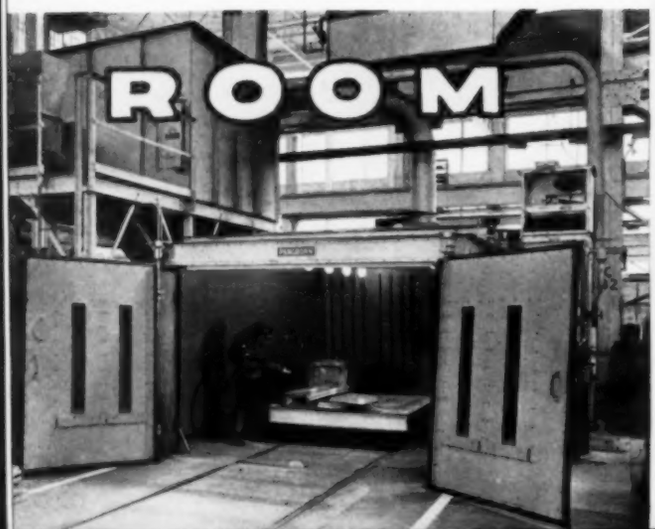
THE WERNER G. SMITH COMPANY

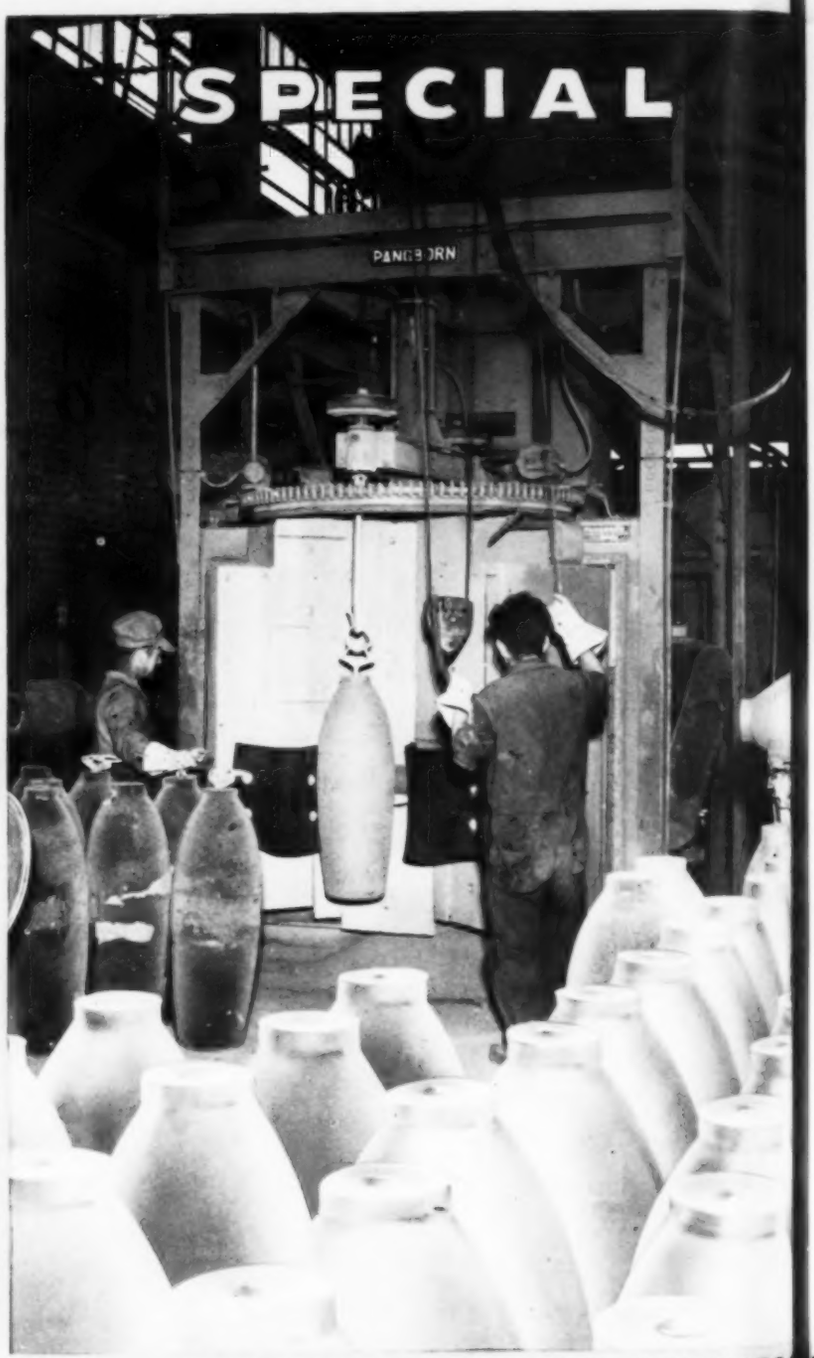
(DIVISION OF ARCHER-DANIELS-MIDLAND COMPANY)

2191 West 110th Street — Cleveland, Ohio

Save Machining

A BIG





WORLD'S LARGEST MANUFA URE

PAN

HAGERSTOWN -

ORDER

30 ROTOBLAST UNITS 30

ALL FOR ONE PLANT

"THE LARGEST SINGLE ORDER ever issued for AIRLESS BLAST CLEANING equipment" . . . just awarded to the Pangborn Corporation.

THIRTY ROTOBLAST UNITS . . . a cleaning force which will remove scale from **48,000** pounds of war work per minute!

28 AIR BLAST ROOMS 28

WITH DUST CONTROL--ALL FOR ANOTHER PLANT

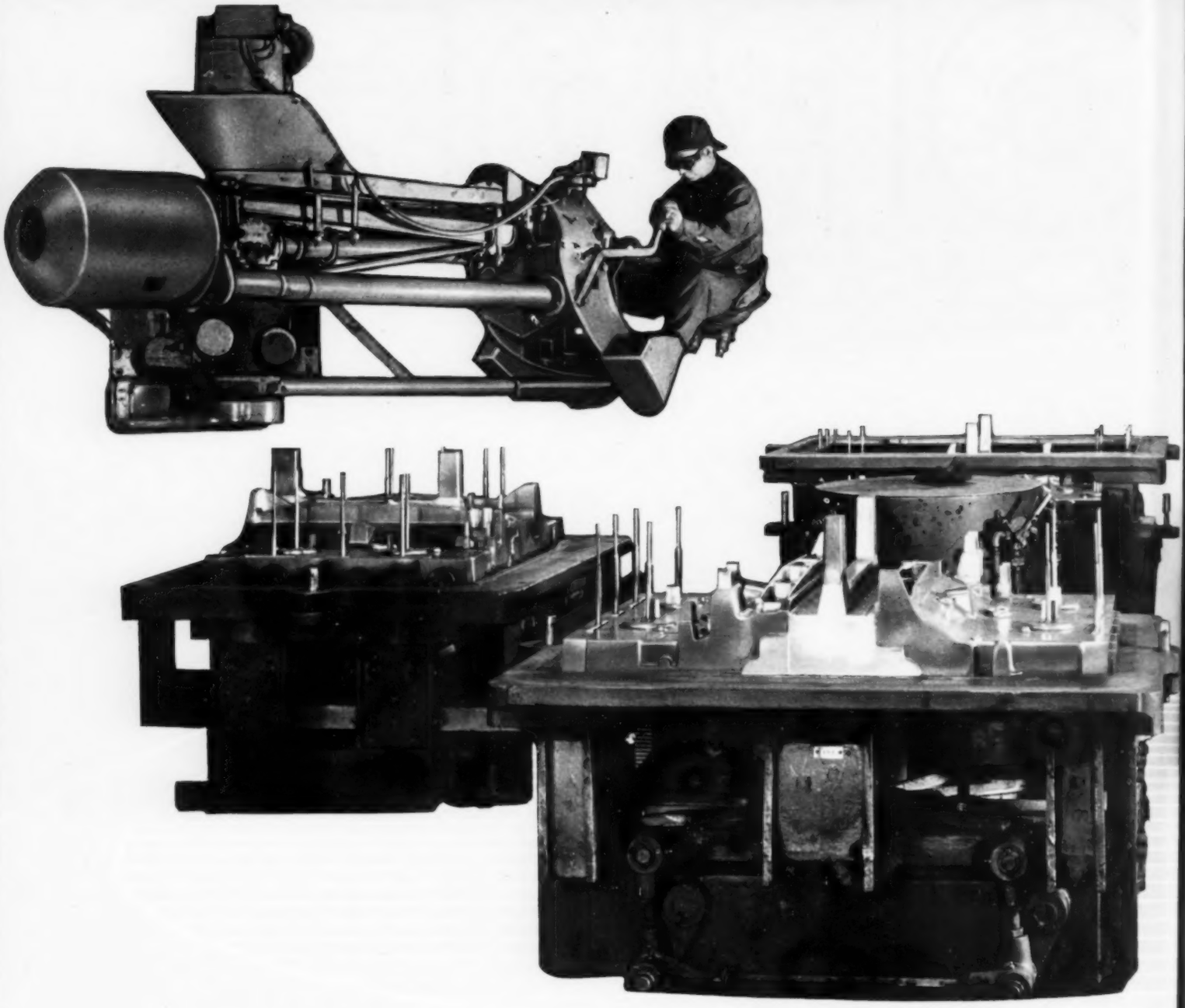
THE LARGEST SINGLE ORDER for AIR BLAST CLEANING equipment . . . consisting of TWENTY EIGHT BLAST ROOMS . . . *"for cleaning steel castings"* . . . also awarded to Pangborn.

THE LARGEST ORGANIZATIONS IN THEIR FIELDS . . . each with tremendous past experience and skilled fact-finding facilities . . . *BUY "PANGBORN"!*

FA URER OF BLAST CLEANING AND DUST CONTROL EQUIPMENT

GBORN ★

MARYLAND



It Takes a CHAMPION to Keep Pace with the SPEEDSLINGER . . .

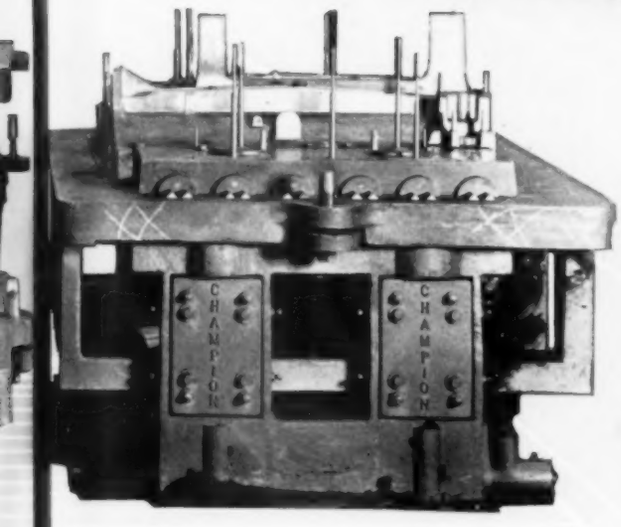
When the *Speedslinger* is ramming 1,000,000 pounds of sand every eight hours, you can't afford to slow up production with inferior pattern draw equipment. *Champion* Flask Lift or Push-off Machines insure the best results from your *Speedslinger* or *Sandslinger,* because those modern mechanisms can be operated only as fast as the molds are taken away. Therefore, it is real economy to serve America's most efficient ramming device with the most efficient and most dependable Push-off Machines. Especially when "all out" war demands "all out" production.

CHAMPION FOUNDRY & MACHINE CO.

1318 W. 21ST STREET, CHICAGO, ILL.

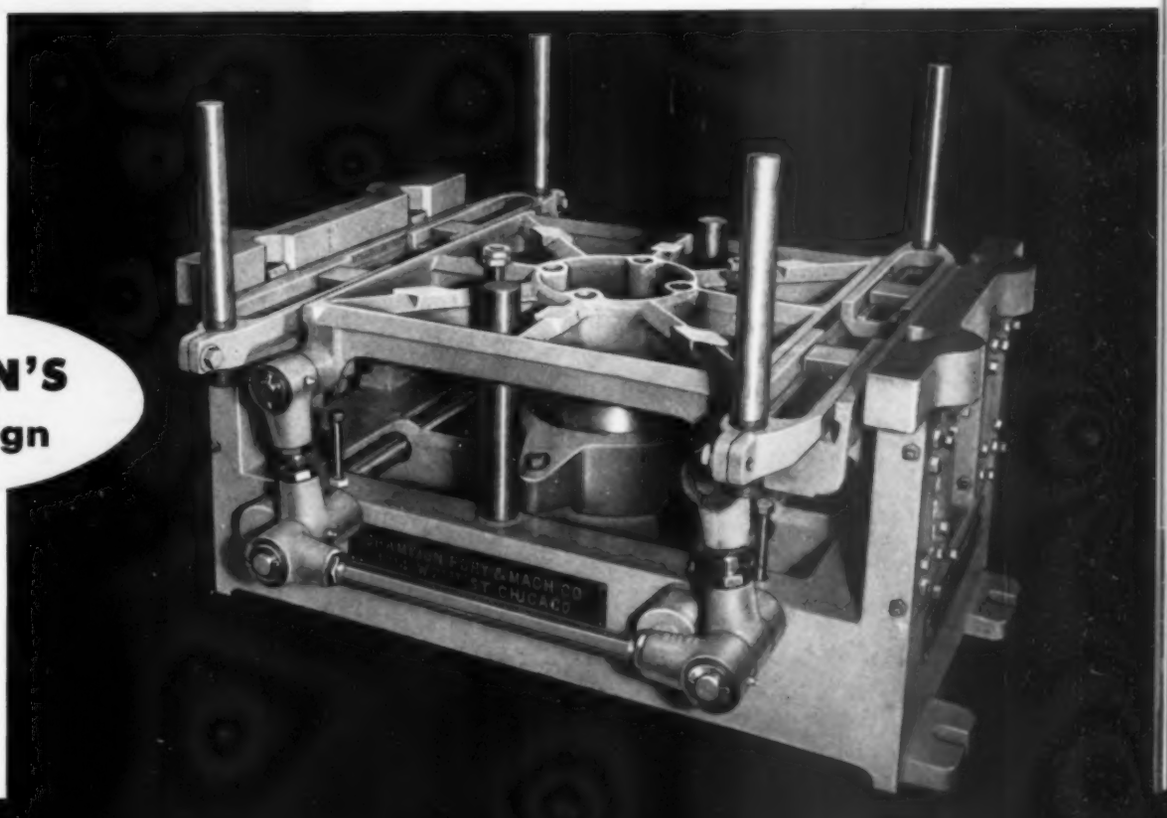
CHAMPION

Built to Serve Well



Somewhere in America where the race for greater war production is being won by Americans

1. Four-point crank mechanism acts as a positive equalizer, insuring a perfect lift, even with an unbalanced load.
2. Power applied direct to the load, not through the crank mechanism.
3. Accuracy of the draw not dependent on guides or cylinder.
4. Draw mechanism principle is designed for 100% efficiency on push-off jobs.
5. HARDENED and GROUND PINS AND BUSHINGS used on all crank, connection and connecting rod mechanism.
6. Built right and work right for today's "all out" production.
7. Accommodate a wider range of flask sizes.
8. Can be used with either Sandslinger, Speedslinger or turntable units.
9. Stripping plates can be eliminated.
10. Patterns cannot get out of alignment. Castings are true to size.
11. Pattern equipment and mounting is simple and economical.
12. Pattern changes made quickly and easily.

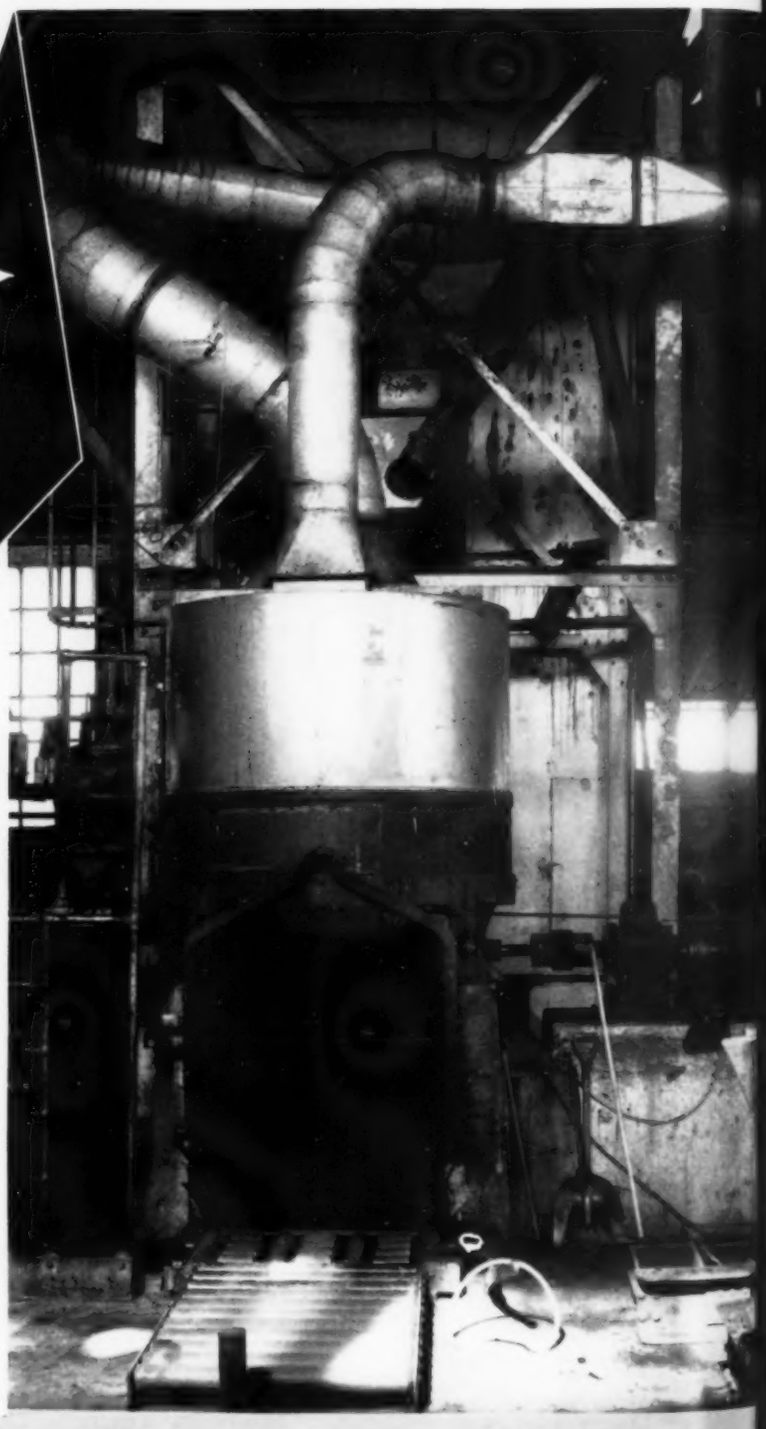


CHAMPION'S Modern Design

It takes a *Champion* to keep pace with a *Speedslinger*

Troubled with *HOT* SAND?

— then get a SIMPSON INTENSIVE MIXER Equipped with the "NATIONAL" COOLING HOOD

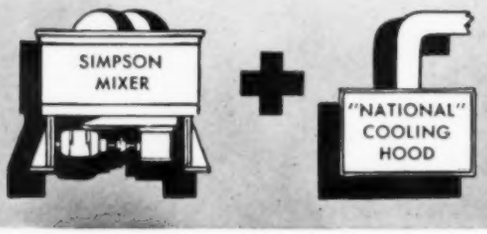


IF you are troubled with hot sand conditions in your foundry, you are probably faced with one or more of these 5 problems:

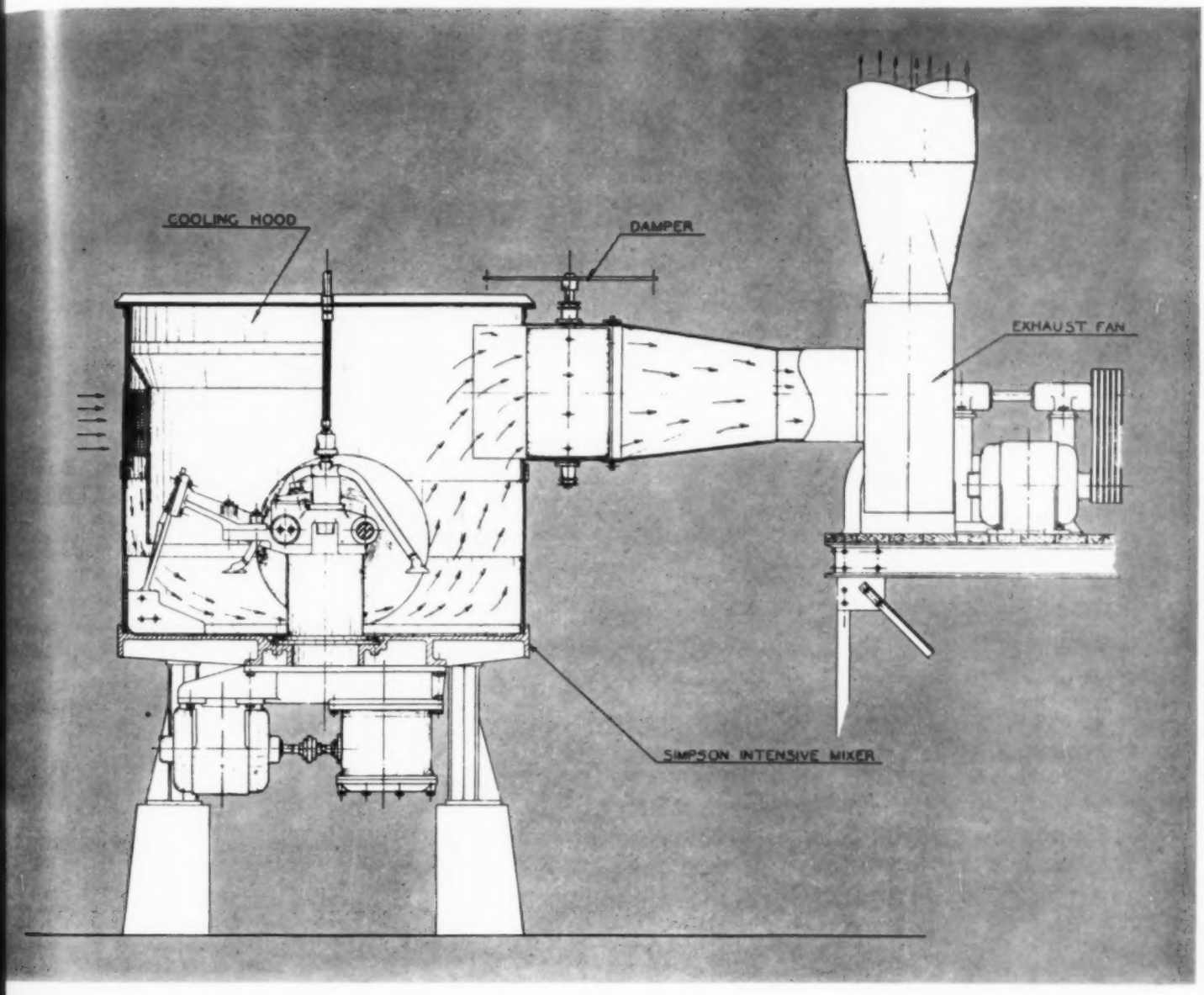
(1) Sand sticking to patterns; (2) Dirty castings; (3) Lack of moisture control; (4) Necessity of heating patterns; and (5) Excessive patching of molds.

Simpson Intensive Mixers equipped with National Cooling Hoods will provide an efficient, economical solution to any or all of these problems. With these units, sand can be delivered to the mixer at temperatures up to 350° F., and in the normal mixing cycle, be reduced in temperature so that when the sand is delivered at the molding station, it will be not more than 15 to 20 degrees above room temperature.

National Cooling Hoods may be installed on new or existing mixers. Full details will be furnished on request.



Efficient, Low Cost Solution to HOT SAND PROBLEMS



HERE'S HOW IT WORKS:

Controlled cooling, with the National Cooling Hood—Simpson Intensive Mixer combination, is accomplished with an induced draft rather than with a positive pressure. One of the most important features of this design is the use of a damper in the exhaust outlet, which makes it possible to shut off the blast while the bonding material is being added, preventing any loss of bond.

Illustrated above is a schematic view of the National Cooling Hood installed on a Simpson Mixer, showing construction details. Various piping arrangements are available, depending on the location of existing equipment. Shown at the left is a No. 2 Simpson Mixer, equipped with a National Cooling Hood, installed at a large steel foundry.

SIMPSON
INTENSIVE
MIXERS

NATIONAL ENGINEERING COMPANY

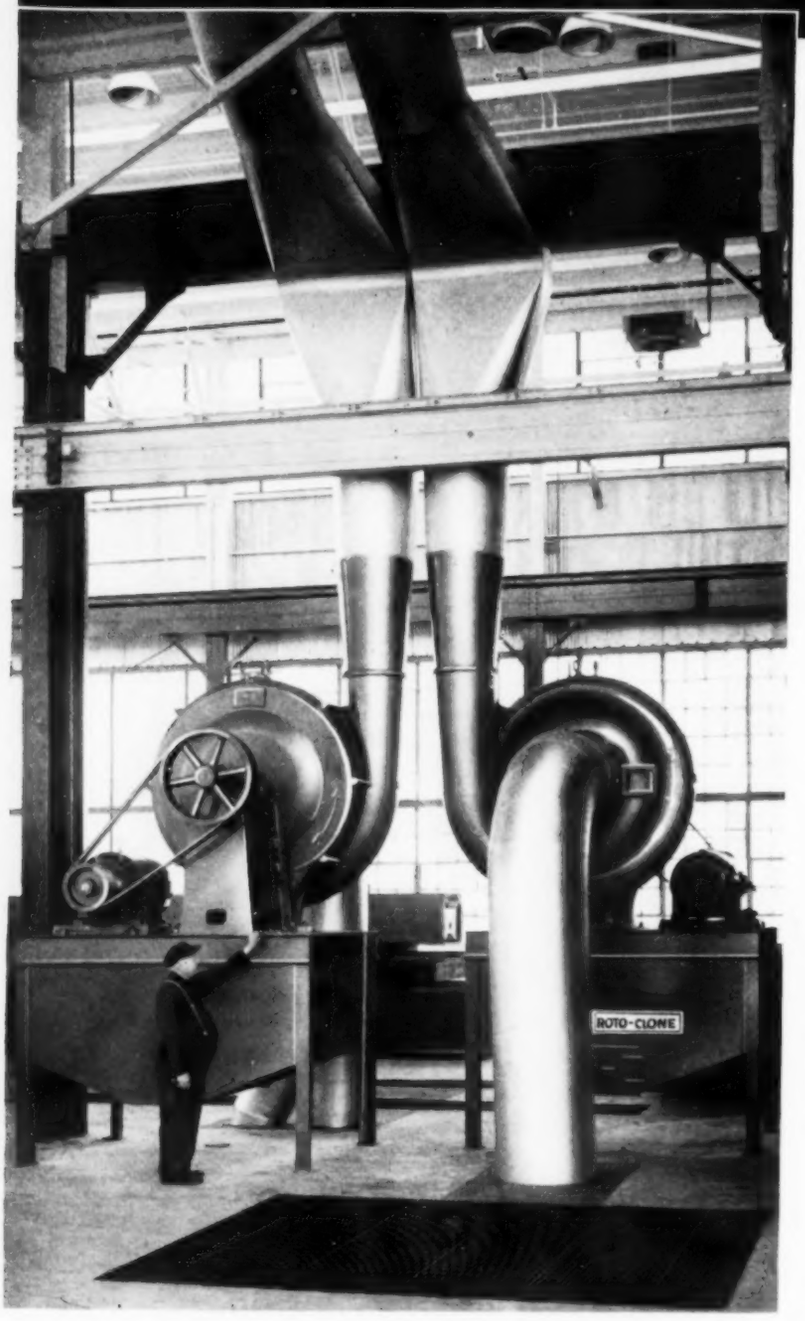
MACHINERY HALL BUILDING • CHICAGO, ILLINOIS

Manufacturers and Selling Agents for Continental European Countries:—The George Fischer Steel & Iron Works, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia—August's Limited, Halifax, England. For Canada—Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand—Gibson, Battle & Co., Pty., Ltd. Sydney, Australia

ROTO-CLONE

Solves all

CASTING CLEANING AND FINISHING OPERATION DUST PROBLEMS



The Roto-Clone combined exhauster and dust separator is particularly well adapted to the collection of dust caused by abrasive cleaning, grinding and casting finishing. Shown here is a typical Roto-Clone dust collection system served by floor grills, clearly visible in the picture, through which the dust is exhausted. In this installatior cleaned air is exhausted through the roof to the outside. In cases where outside exhaust is impractical, the cleaned air may be returned to the workrooms through high efficiency viscous air filter after-cleaners which may be mounted above the Roto-Clone.

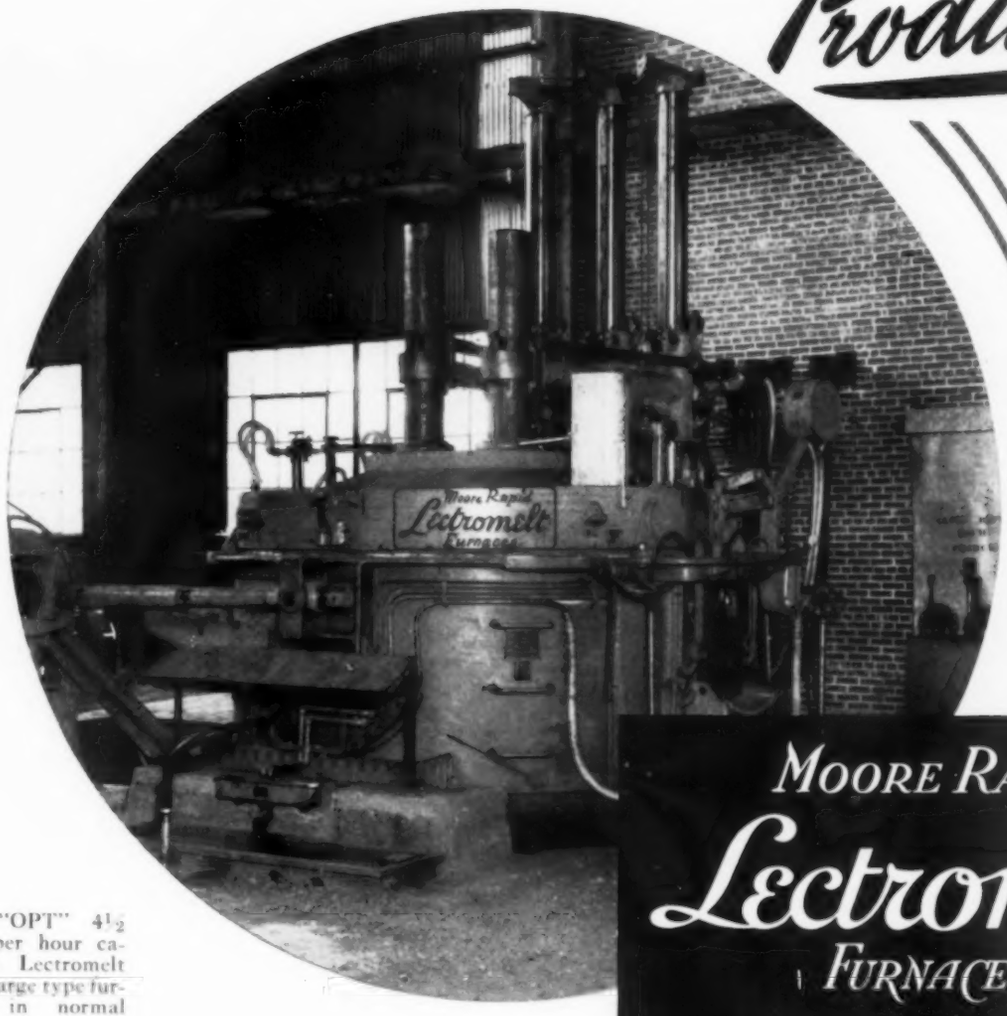
Roto-Clones are available in a large range of sizes and types to meet every dust collection need. Write for Roto-Clone bulletins or send us details of your dust problem and we will be glad to consult with you without obligation.

AMERICAN AIR FILTERS

AMERICAN AIR FILTER COMPANY, INC., 266 CENTRAL AVE, LOUISVILLE, KY.
INCORPORATED

IN CANADA, DARLING BROTHERS, LIMITED, MONTREAL, P. Q.

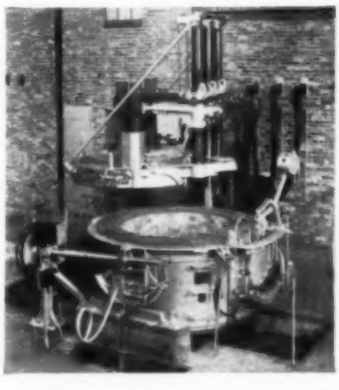
FOR INCREASED STEEL *Production*



Size "OPT" 4½ tons per hour capacity Lectromelt top charge type furnace in normal operating position.

Top Charge Type

MOORE RAPID
Lectromelt
FURNACES



Top charge LECTROMELT furnace with roof raised and rotated ready for charging.

★ Twenty-four hours per day, LECTROMELTS in increasing numbers are turning out essential steel and iron.
The top charge type LECTROMELT furnace speeds up production.
Moore Rapid LECTROMELT furnaces, both top charge and door charge types, are built in standard sizes ranging from 100 tons to 25 lbs. capacity. Years of experience, gained from specializing in the manufacture of electric furnaces, are helping us to efficiently serve all who produce steel and iron. Write for details on LECTROMELT equipment to meet your requirements.

PITTSBURGH LECTROMELT FURNACE CORPORATION
Pittsburgh, Pennsylvania

COUNT US

THE best way for a supply house to contribute to our ultimate victory is to produce and market better supplies—supplies that enable foundries to put out more and better castings—faster.

We at Federal are making every effort to do just that; that's why we say "Count us in, too."

It will pay you to read about the products listed below and on the opposite page. Whether it's an old stand-by or a new favorite, you can be assured that each product is as good as our more than 30 years experience can make it.

VICTORY NON-SILICA PARTING

The answer to all parting questions. Saves money because it costs less per barrel. Victory Parting is white in color and has absolutely no free silica content. Your molders will like it—easy to use, gives perfect lifts and will not build up on patterns.

FEDERAL GREEN BOND

The ever-growing list of Green Bond users is the best proof of its quality. Foundries prefer it because Green Bond is uniform. Sand formulas set up with Green Bond need not be changed from shipment to shipment. We guarantee the uniformity of Federal Green Bond by constant laboratory control for your protection.

No. 867 STEEL WASH

A new carbon-free steel wash. No. 867 mixes with plain water because it has its own bond. Stays in suspension, does not settle out and require constant re-mixing. No. 867 Steel Wash covers well, can be dipped, sprayed or brushed. Will not buckle on cores or molds when torched or baked.

THE FEDERAL FOUNDRY S

CHICAGO CHATTANOOGA, TENN. MILWAUKEE MINNEAPOLIS

IN, TOO....

ROYAL BINDER

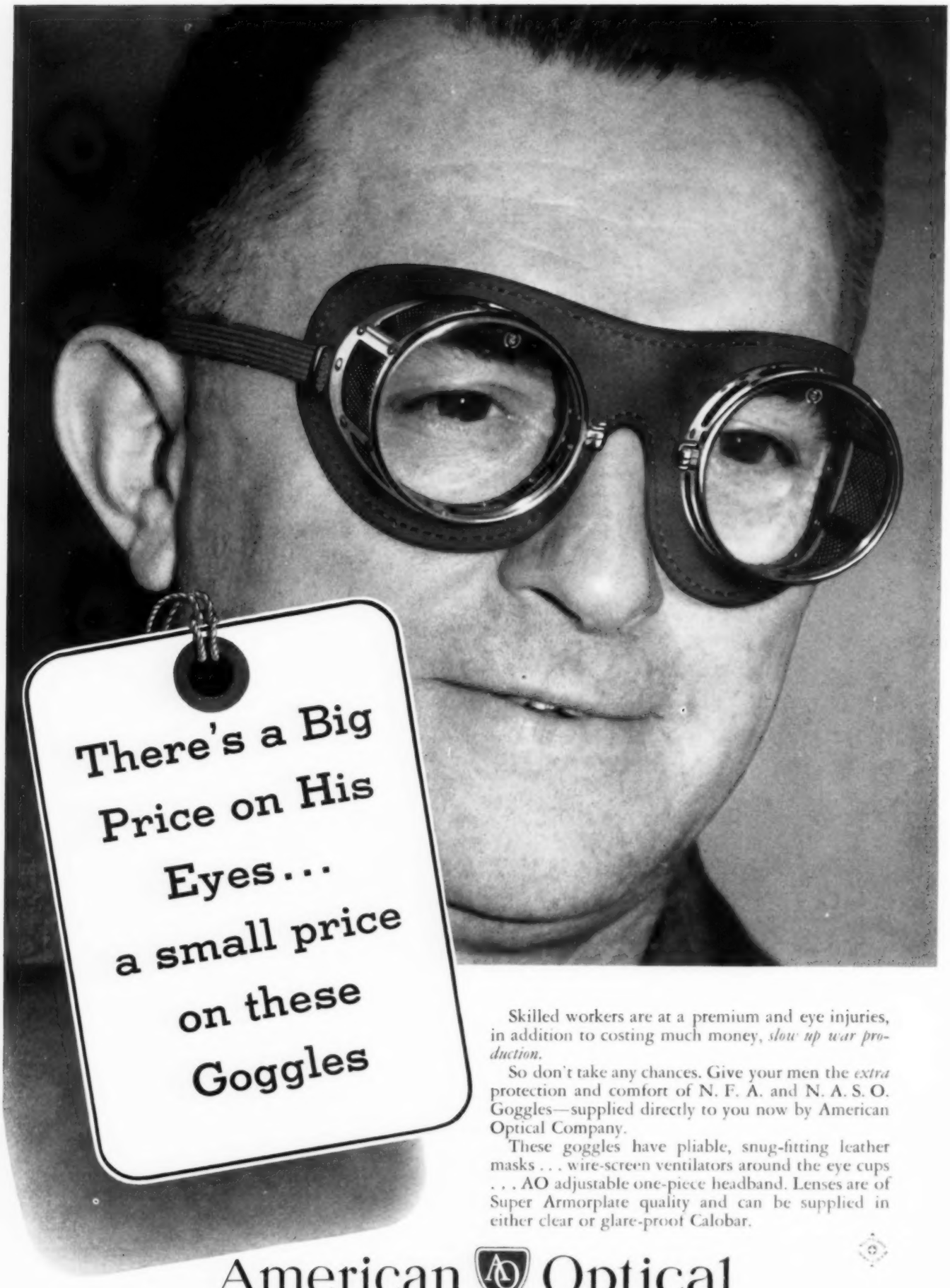
If you want a binder that has everything—try our new Royal Binder. Royal Binder can do more than any core binder has a right to!

Here are Ten "Reasons Why"

1. **INCREASES OVEN CAPACITY**—Royal Binder, by reducing the baking time, can increase the capacity of your present ovens 20 to 25%. Typical instances are—one midwest foundry cut baking time from eight to six hours—another reduced their time from fourteen to eleven hours.
2. **SAVES OIL**—If you now use oil at the ratio of 1 to 45 up to 1 to 65, you can replace 25% of that oil and make better cores at less cost.
3. **ADDS GREEN STRENGTH**—Royal Binder has high green strength which makes it easier and safer to handle green cores.
4. **REDUCES SMOKE**—Royal Binder greatly reduces the smoke and gas hazard in two ways: first, by reducing the oil content up to 25% and second, because Royal itself gives off very little smoke.
5. **SAVES NAILS!**—Royal can reduce your nailing costs! One quart of Royal Binder mixed with 600 pounds of facing sand recently used in a local foundry completely eliminated nailing—and dropping—on a large flat-cope job.
6. **SMOOTH**—Royal Binder is "smooth" in the core boxes, a feature your coremakers will like.
7. **SAVES CEREAL BINDERS**—Because of the high green strength of Royal, it has reduced the cereal binder content of some core mixes up to 50%.
8. **A STRONG PASTE**—Royal is an excellent paste; produces a joint as strong as the core itself.
9. **FACING ADMIX**—Tests made prove that Royal Binder is an ideal admix for facing sand.
10. A continued increase in the number of new users and repeat orders furnishes the final reason why *you* should try Royal Binder. Order a trial lot now!

SUPPLY COMPANY • 4600 EAST 71st STREET CLEVELAND, OHIO

DETROIT NEW YORK ST. LOUIS RICHMOND, VA. UPTON, WYO.



Skilled workers are at a premium and eye injuries, in addition to costing much money, *slow up war production.*

So don't take any chances. Give your men the *extra* protection and comfort of N. F. A. and N. A. S. O. Goggles—supplied directly to you now by American Optical Company.

These goggles have pliable, snug-fitting leather masks . . . wire-screen ventilators around the eye cups . . . AO adjustable one-piece headband. Lenses are of Super Armorplate quality and can be supplied in either clear or glare-proof Calobar.

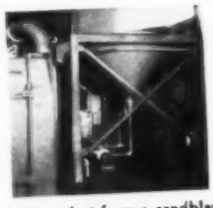
American Optical

COMPANY

SOUTHBRIDGE, MASSACHUSETTS

M-3 Medium tank in action.—
U.S. Army Signal Corps photo.

There's Battle To Do On The Industrial Front, Too!



Licking dust from a sandblast room in a jobbing foundry.

Cleaning up dust with a "Uni-Flo" Hood on a foundry shake-out.

Defeating grinding room dust in a western foundry.

It's the battle to produce more, more, ever more castings for the vast number of planes, tanks, guns, ships and machine tools needed to complete the tremendous offensive and defensive war machines required to win this war. *Taxing present production facilities to the utmost will do the job.* But the worker and plant working conditions must be considered even more seriously during these three shift, over-time operations. Dust and fumes should not be allowed to slow down production. Ventilating all dust creating operations will avoid this. And the simplest, most efficient way is to install the proper Multi-Wash Dust Suppression equipment, for once installed, it requires no care or attention, but automatically keeps dust and fumes under control. No moving parts — nothing to burn, clog, freeze or rapidly wear. Uses only water, over and over as the collecting medium. Affords *high constant efficiency.*

Made in standard sizes, with pumps and dewatering equipment suitable for every type and size of foundry.

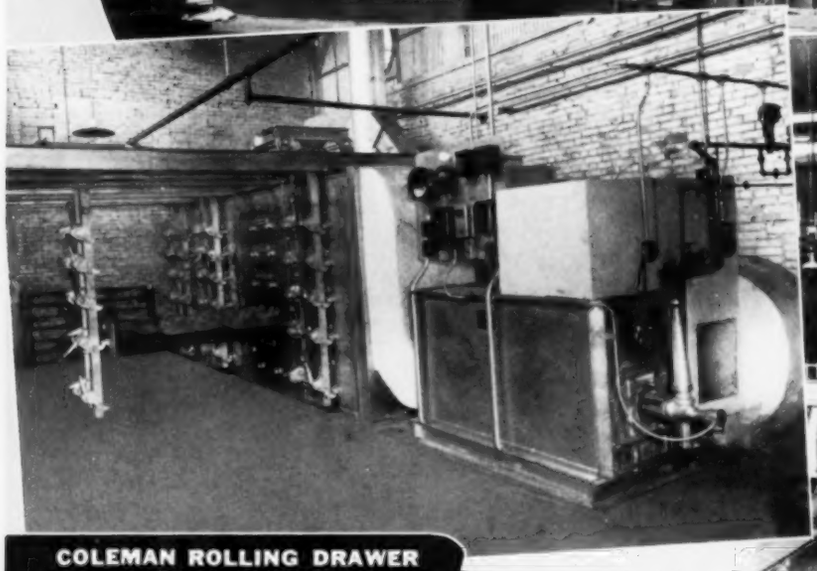
Let Schneible engineers tell you what others are saving with Multi-Wash Systems.

CLAUDE B. SCHNEIBLE COMPANY
3953 Lawrence Ave., Chicago
Offices in Principal Cities

SCHNEIBLE

Perfect Core Baking

COLEMAN CAR TYPE CORE OVENS
For all classes of heavy and medium cores.



COLEMAN ROLLING DRAWER CORE OVENS
Wide range of sizes for high speed baking of medium and small cores.

COLEMAN TOWER OVENS
Amazing production with these high-speed continuous ovens.

COLEMAN

and Mold Drying... 50 to 75% Faster, with COLEMAN OVENS

over 6,000 INSTALLATIONS

COLEMAN TRANSRACK CORE OVENS
Most popular all-purpose type of core oven. Wide range of standard sizes.

No matter how carefully you select your sands and core binders or how skilled your core makers, your cores can't be right unless they are baked right! Therefore, in times like these when it is so essential to avoid core make-overs and casting rejects, select Coleman Ovens to do the job right—faster, better, cheaper!

For over 36 years, we have specialized in the design and construction of fast, efficient and economical core and mold ovens. This, together with the experience gained in building over 6,000 installations, is the reason for the outstanding preference of leading foundries for Coleman Ovens.

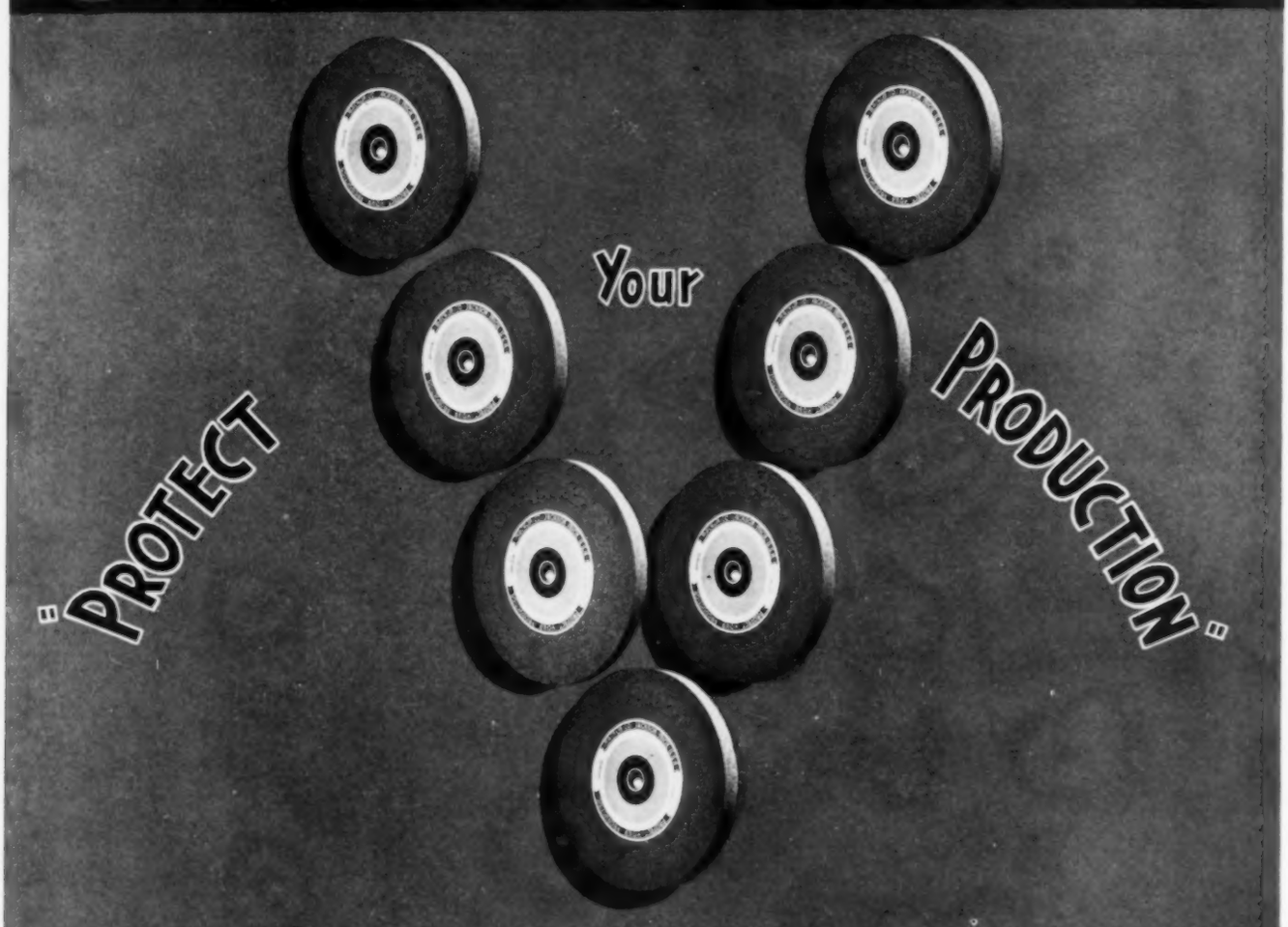
Coleman Ovens are available in all types and sizes—for operation with any fuel. Write for Catalog.

•

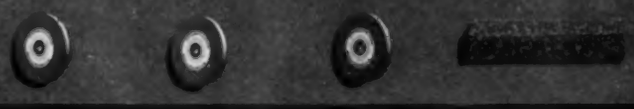
THE FOUNDRY EQUIPMENT CO.
BUILDERS OF COLEMAN AND SWARTWOUT OVENS
CONTRACTING ENGINEERS AND MANUFACTURERS
CLEVELAND, OHIO

CORE and MOLD OVENS

MACKLIN
GRINDING WHEELS



For Victory . . . *Macklin* high quality, uniform grinding wheels are made in all sizes and shapes for all kinds of wartime material and equipment jobs. Ask for the services of a *Macklin* Field Engineer.



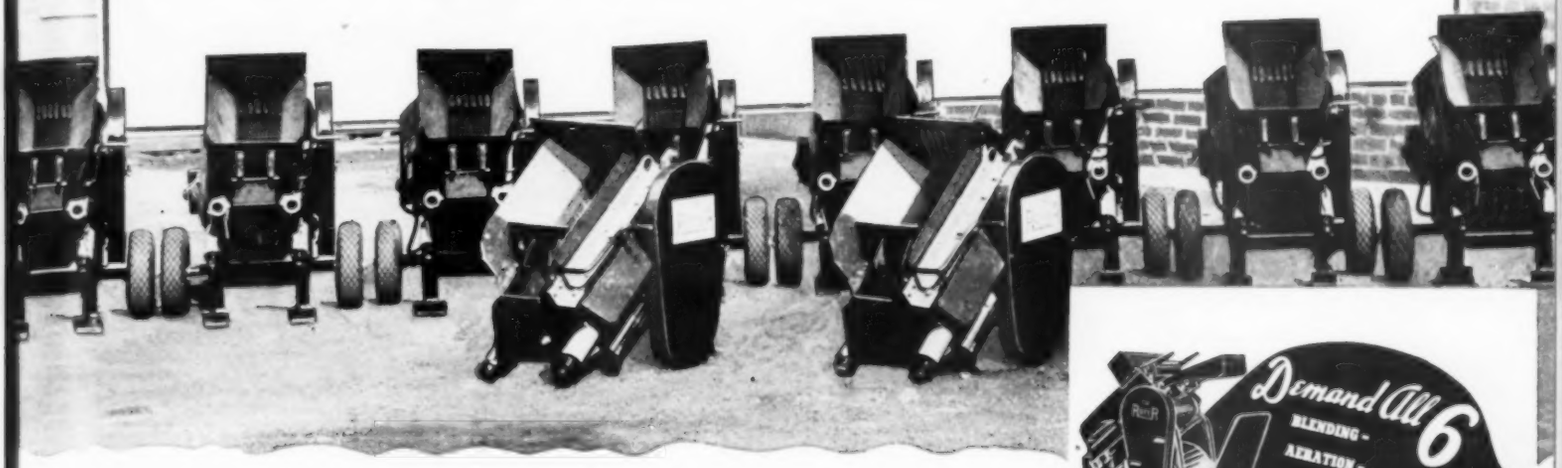
MACKLIN COMPANY

Manufacturers of GRINDING WHEELS — JACKSON, MICHIGAN, U. S. A.

Distributors in all principal cities

Sales Offices: — Chicago - New York - Detroit - Pittsburgh - Cleveland - Cincinnati - Milwaukee - Philadelphia

4,000th ROYER SAND SEPARATOR and BLENDER Is No. 20 for an Old Customer—*A Famous Airplane Builder*



THE 4,000th Royer Sand Separator and Blender, in the rush of war-time production, was completed without fanfare or ceremony and shipped at once, with nine others — two stationaries and seven portables — to an old customer, a well known Eastern airplane builder.

This company, doing a great and vital work in our war effort, is no stranger to Royers. Since May, 1928 they had purchased eight Model B-2's and two Model NB-2's. The shipment which included No. 4,000 consisted of eight Model NB-2's and two Model NB stationary units; a total of 20 Royers for this user. This order is further conclusive proof of Royer's participation in the Victory drive; while the big repeat order is worthy testimony of Royer's efficiency in preparing foundry sand—just the way it should be.

In these days, when the conservation of time and metal is all-important, you can't afford to use poorly prepared sand when a low cost Royer can give you these six essentials for properly conditioning sand:

(1) Thorough refuse removal; (2) Positive lump breaking; (3) Complete blending and mixing; (4) Even moisture distribution; (5) Increased permeability; and (6) Double aeration—on the belt and in discharging.

Let one of the eight models of Royer Sand Conditioners or two models of Combination Sand Conditioners and Scrap Removers help you to reduce discounts and increase your casting production with better prepared sand.

May we give you full details on operating economies and delivery dates on your priority requirements? Write today.

THE ROYER

ROYER FOUNDRY & MACHINE CO. *KINGSTON, PA.*

DELTA FOUNDRY PRODUCTS

DELTA GRAKOAT WASH

Extensively used by grey iron, malleable, aluminum and non-ferrous foundries to obtain unusually smooth casting surfaces.

PRINCIPAL IMPORTANT FEATURES OF DELTA GRAKOAT WASH

- **MOISTURE PROOF** — When thoroughly dried, will not absorb moisture.
- **NO PRECIPITATION** — When properly mixed, will stay in suspension indefinitely.
- **HIGHLY REFRACTORY** — Molten Metal lays on surface without the least disturbance.
- **UNUSUAL HIGH FUSION** — Will not fuse or sinter below 3400 degrees F.
- **NO GAS** — It is non-reactive with molten metal and liberates no gaseous vapors.
- **ADHERES TO SAND SURFACES** — Penetrates into sand surfaces, which prevents flaking, peeling, scabbing, when in contact with molten metal.
- **EASY TO APPLY** — Can be sprayed, swabbed, dipped or brushed on either green or dry sand surfaces.
- **PRODUCES SMOOTH SURFACES** — Casting surfaces are free from burn-in or metal penetration.
- **CUTS CLEANING COSTS** — Surfaces are smooth and require minimum amount of cleaning.
- **ECONOMICAL TO USE** — Covers greater surface area than other washes.

DELTA CORE AND MOLD WASH FOR STEEL

Delta Core and Mold Wash is being adopted more and more by modern steel foundries throughout the nation.

For armor plate castings, steel cast shells... and all other types of steel castings used for war purposes.

It is Dilatometer tested for hot strength to insure fusion resistance and positive adherence to the core and mold surfaces when in contact with molten steel.

DELTA PARTEX-NUT SHELL PARTING

DELTA PARTEX PARTING, the modern scientific Lycopodium replacement, is used by the majority of the leading foundries. Most aluminum foundries casting air-cooled cylinder heads for fighter and bomber planes have adopted it as a substitute for Lycopodium. It is the most efficient parting available... insuring better core and mold surfaces. Absolutely safe and non-hazardous. Economical... costs only a fraction of the cost of Lycopodium.

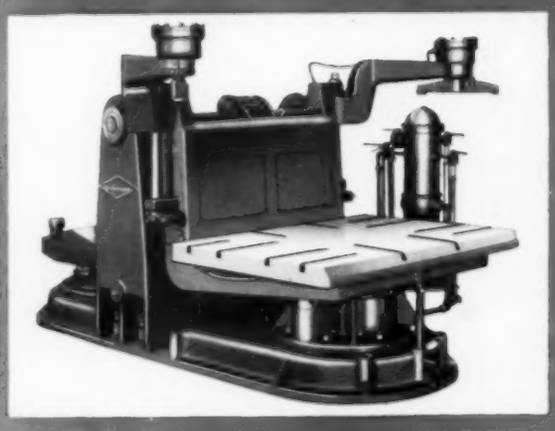
DELTA OIL PRODUCTS CO.

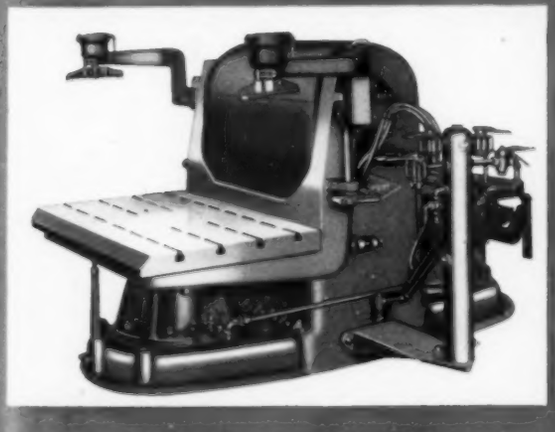
MANUFACTURERS OF INDUSTRIAL AND AUTOMOTIVE OILS, GREASES, AND COMPOUNDS

MILWAUKEE WISCONSIN

Magnesium Castings

*OFFICIAL PHOTO, U. S. ARMY AIR CORPS





AMERICA'S FIGHTING PLANES

Need Greater Production of Magnesium Castings

*Many of the leading foundries of America featuring magnesium castings are using Davenport Foundry molding machines.

The United States government is demanding greater production of magnesium castings for our air force and if you are contemplating converting your present foundry to the production of magnesium castings or increasing your present facilities, it will pay you to investigate why Davenport Molding Machines are enjoying this outstanding preference.

This type of work can be adapted to Davenport Molding Machines without any special or expensive pattern equipment, both for molding or core work.

"DAVENPORT" LINE OF MOLDING MACHINES

JOLT ROLLOVER DRAW MACHINE
Model SA (Seven sizes)
Capacity from 750 to 12,000 lbs.
Model A (Six sizes)
Capacity from 1,000 to 12,000 lbs.

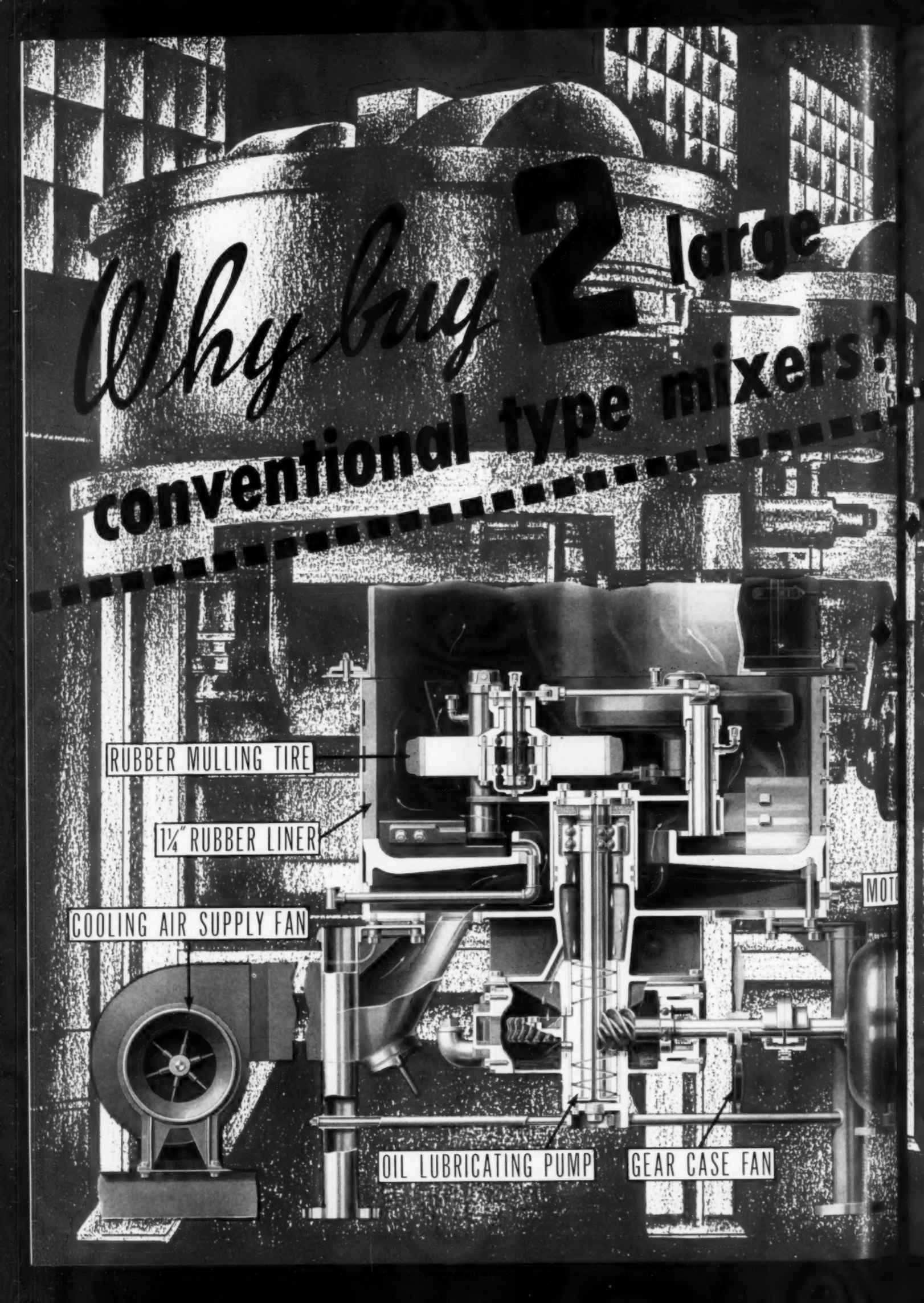
JOLT STRIPPER OR PUSH-OFF MACHINES WITH ADJUSTABLE LIFT PINS
Six sizes—Capacity from 1,000 to 10,000 lbs.

PLAIN JOLT MACHINES
Fourteen sizes—Capacity from 200 to 25,000 lbs.

Write today for our new catalog.

*The list of these foundries will be supplied if requested upon your stationery.

DAVENPORT MACHINE & FOUNDRY CO.
DAVENPORT, IOWA, U. S. A.


Why buy 2 large
conventional type mixers?
RUBBER MULLING TIRE
1¼" RUBBER LINER
COOLING AIR SUPPLY FAN
OIL LUBRICATING PUMP
GEAR CASE FAN

1 small SPEEDMULLOR will do a better job!

The ***Speedmullor*** is just a midget compared with conventional type mixers. A Model "40" ***Speedmullor,*** 45 inches in diameter, is capable of mulling 10 cubic feet per minute, whereas a conventional mill of lesser batch capacity and 80 percent slower is 60 inches in diameter. Hence you require at least two conventional mills and treble the floor space to even approximate the production of one ***Speedmullor.***

But economy of floor space and far greater mulling capacity are only the beginning. The ***Speedmullor*** is 4½ times faster because speed is as essential toward correct mulling as it is necessary in a cream separator, emory wheel, woodworking tool, airplane or cupola fan. This speed differential of 4½ to 1 does not mean that the ***Speedmullor*** mulls within that ratio. It may be much faster.

Mulling speed means RPM plus diameter. It is rim or peripheral speed. ***Speedmullors*** travel 1,400 feet per minute to assure greatest mulling efficiency. At this speed centrifugal force carries the sand out and holds it against the side wall where there is no speed limit. There it is plowed up and down and tossed about for complete and constant aeration at different heights, depths and sections. Plows turn the sand over and over. Rubber wheels mash lumps and smear binders, oil and water on each silica grain. Such natural action never fails to mull sand to a better consistency than obtained from a conventional mill. Likewise, the ***Speedmullor*** can automatically cool the sand and blow off fines when desired, something that cannot be done by any other muller.

The conventional type mill travels only 300 feet per minute. Even that is too fast because the sand must be mixed on the flat bottom plate where centrifugal force prohibits plowing in toward the axis of the periphery, resulting in the sand being carried in front of the outside plow and not mixed at all.

Here are some facts and figures on the smaller ***Speedmullor.*** You can verify them by writing Mr. H. Schleicher, General Manager, Enot Foundry Co., Wayne, Michigan. "Our ***Speedmullor*** shows the following startling economies for one year during which we produced one-third greater tonnage than the previous year when we used a conventional type mill. 1. Not one penny of maintenance. 2. 50% saving in labor. 3. Core oil reduced from $5400 to $2600 in spite of 33⅓% increase in production. 4. Flour reduced to ⅓ of former requirements. 5. The use of less binders and oil saved drying, shakeout and cleaning time, and eliminated cracked castings."

The foregoing are a few *facts and figures* concerning ***Speedmullor*** superiority. Hundreds of ***Speedmullor*** users will tell you similar stories. If there is any doubt in your mind about ***Speedmullor*** efficiencies, don't accept our word or that of any other manufacturer. Consult a user or a competent laboratory. They can quickly prove that slipping and sliding over the sand is inadequate—that slow mixing and grinding is not mulling—that mulling speed which keeps the sand suspended and constantly aerated while smearing binders is the recipe for good castings.

THE BEARDSLEY & PIPER COMPANY

2541 North Keeler Avenue, Chicago

Dear Pop:

Even an old Rainbow Divisioner like you would pop your eyes at the army we're putting together this time. Let me tell you, they're doing everything to make up just about the best bunch of fighting galoots you ever saw.

And that goes for what they do for us off duty, too! Take this new clubhouse we got just outside of camp. It's got radios, dance floors, nice soft chairs and everything. And, Pop, you can get something to eat that won't cost you a month's pay!

Now, the army isn't running this. The USO is. And most of the other camps got USO clubs too, because you and a lot of other folks dug down and gave the money to the USO last year.

But, Pop, you know what's happened since then. Guys've been streaming into uniform. Last year there was less than 2 million of us. This year there'll be 4 million. And the USO needs a lot more dough to serve that many men—around 32,000,000 bucks I hear.

Now, Pop, I know you upped with what you could last time. But it would sure be swell if you could dig into the old sock again. Maybe you could get some of the other folks in the neighborhood steamed up, too.

It will mean an awful lot to the fellows in camp all over the country. Sort of show 'em the homefolks are backing them up. And, Pop, an old soldier like you knows that's a mighty nice feeling for a fellow to have. See what you can do, huh, Pop?

Bill

GIVE TO THE

USO

Send your contribution to your local USO Committee or to National Headquarters, USO, Empire State Building, New York, N. Y.

HE'S WORKING LIKE FURY
MAKING CORES IN A HURRY!
There's More Fight Than We Knew
In "TORRID" The Heat Wizard
"TORRID"
the Heat
Wizard
"TORRID" CONFESSES
I took it easy in the good old days. No wars... low quotas...just had to heat foundry ovens in my own good time. It took plenty long and I wasted fuel, too. Just following lines of least resistance. No straining and pushing thru small ports to far away spots.
When Despatch engineers showed me what I could accomplish, my old habits vanished. Now I'm fit and doing my best in every oven. See how good that is!
PERFECT CORES AND MOLDS PRODUCED IN 1/3 TIME.
"Torrid"
RECORD PRODUCTION BOOSTS
Results in scores of foundries using Despatch core and mold ovens have made one thing clear: these ovens regularly produce a vastly greater output of better cores and molds than was ever possible before.
Your foundry has its own peculiar problems and methods, but a Despatch foundry oven will fit perfectly into your production line because these ovens are versatile, speedy and efficient.
The following remarks from different foundries express the real satisfaction with Despatch ovens: "New oven, same size, produces 300% more cores" . . . . . "Baking time reduced from 13 hours to 2 ½ hours." . . . . . "Faster flow of material thru foundry" . . . . . "Small cores and large cores bake perfectly in the same oven load".
PHONE or WRITE TODAY for a Despatch representative to check your plant and recommend the oven that will give you top production.
DESPATCH
OVEN COMPANY MINNEAPOLIS

CP GOVERNOR-CONTROL INSURES UNIFORM GRINDING

↑ **VERSATILE AND POPULAR GRINDER** in many foundries is the fast, efficient Chicago Pneumatic 314. This general-purpose grinder is also an ideal tool for light to medium-heavy wire cleaning. It is available in ten models, a wide range of speeds and a variety of handles, extension spindles and optional equipment.

VIBRATIONLESS SPEED UNDER LOAD LENGTHENS WHEEL LIFE

A Grinder For Every Foundry Job

NEW YORK (CP)—Essential to fast uniform grinding is vibrationless, sustained speed under load. In the large line of Chicago Pneumatic Grinders this feature is assured by stability and rigidity of design which, coupled with governer control, not only results in the removal of maximum metal but also minimizes wheel damage and uneven wheel wear.

The latest CP Catalog of Pneumatic Tools and Accessories illustrates and describes the complete line of CP Grinders for the foundry. Write for a copy today.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 E. 44th St., New York, N. Y.

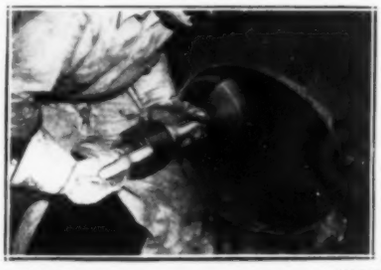
↑ **STURDY CONSTRUCTION**—a feature of all CP Pneumatic Grinders—assures day in and day out service on all types of work with a minimum of maintenance.

CP PNEUMATIC GRINDERS

described in latest Pneumatic Catalog:

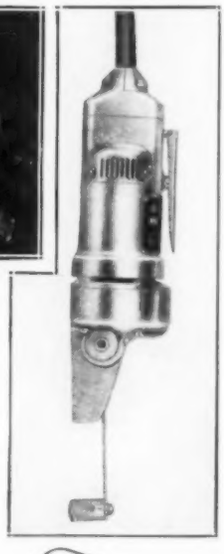
GENERAL PURPOSE
MEDIUM TO HEAVY-DUTY
ROD, DIE AND ANGLE
POLISHERS
SANDERS

SEND FOR A CATALOG



↑ **LIGHT WEIGHT, TRUE BALANCE** of all CP Pneumatic Grinders make handling and control easy for the operator. Result, minimum operator fatigue and increased production.

HANDY TOOL is the CP Universal Electric Special Purpose Scaler → for cleaning castings and firebrick, vibrating moulds, scaling welds.

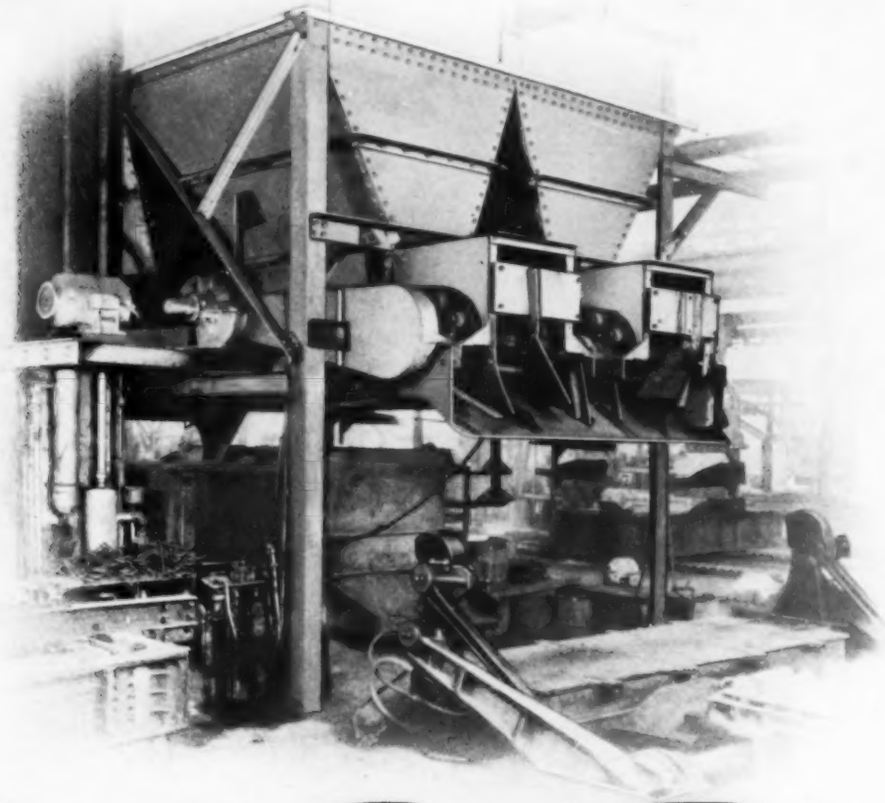


CHICAGO PNEUMATIC

PNEUMATIC TOOLS

ALSO: Air Compressors, Electric Tools, Rock Drills, Hydraulic Aviation Accessories, Diesel Engines

WRENCHES
DRILLS
REAMERS
RIVETERS
CHIPPERS
GRINDERS



Double Flask Fillers
speed the making of large molds

• Bartlett-Snow Flask Fillers are available in a wide variety of types and sizes,—including hopper and undercut gate flask fillers,—swinging chute flask fillers,—pivoted boom flask fillers,—stationary bin and apron feeder flask fillers,—and various special types to meet unusual conditions.

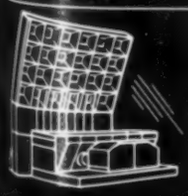
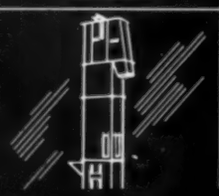
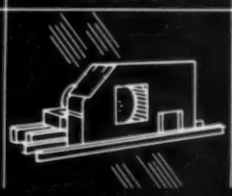
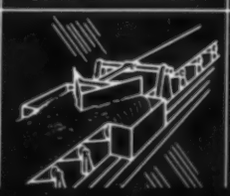
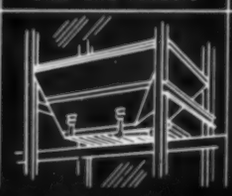
The stationary bin and apron feeder flask fillers are adapted readily to the floor space, head room and other conditions of the individual installation and—when used in multiples as double and triple flask fillers—are specially suited for use with large, long molds, such as those used in certain types of gray iron and steel foundries. The equipment for this service may consist of two or three single units supported on the same structurals, or a single large hopper fitted with two or three apron feeders. In either case the apron feeders at point of discharge are provided with deflecting plates or swinging chutes that catch a portion of the sand and deliver it to the far corners of the flask.

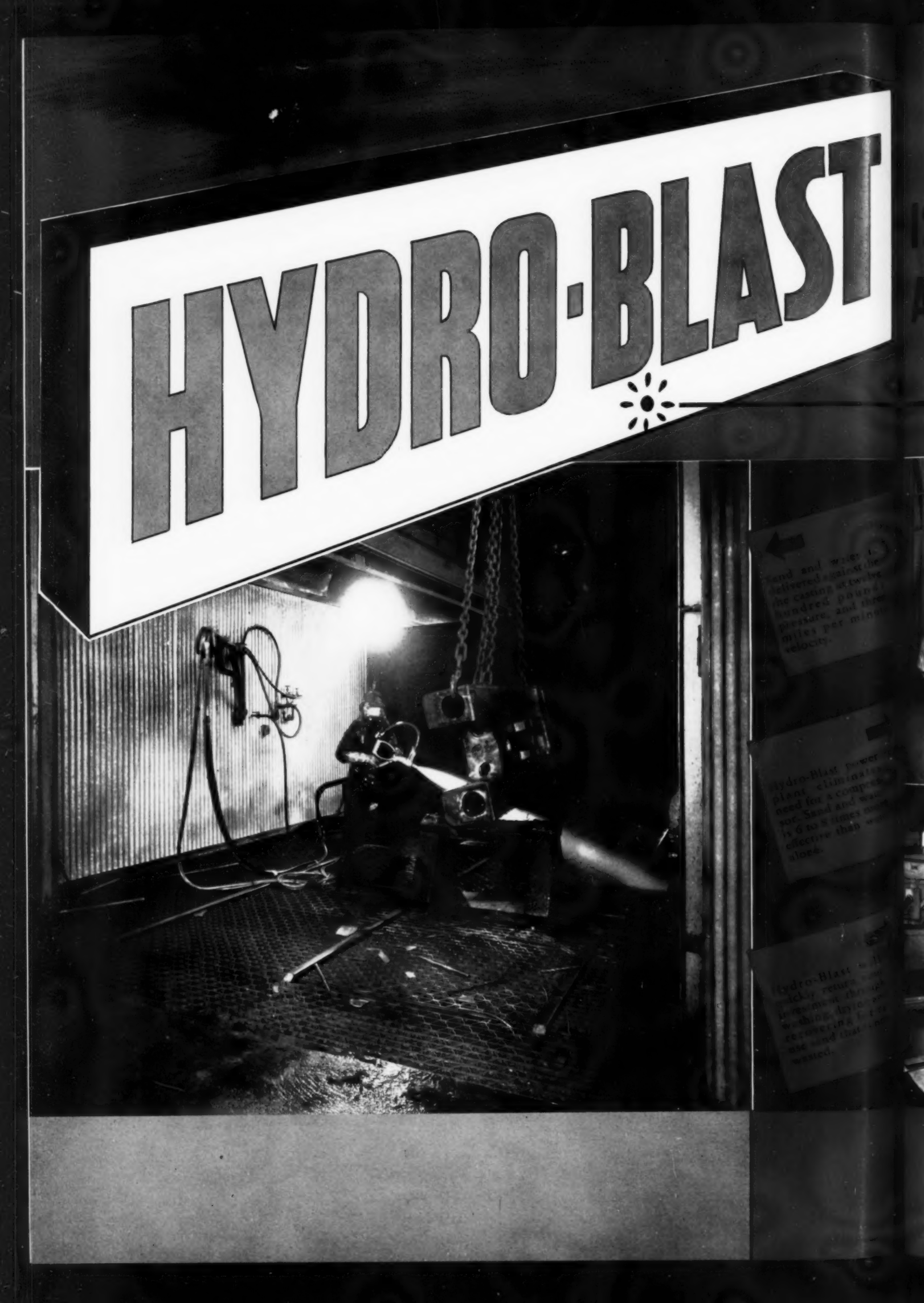
Our recently issued 40-page Bulletin No. 91 illustrates many different types of flask fillers, and other Bartlett-Snow foundry equipment . . . Copies of this Bulletin are available on request.

THE C. O. BARTLETT & SNOW COMPANY
6201 Harvard Avenue **Cleveland, Ohio**
Engineering and Sales Representatives in the Principal Cities

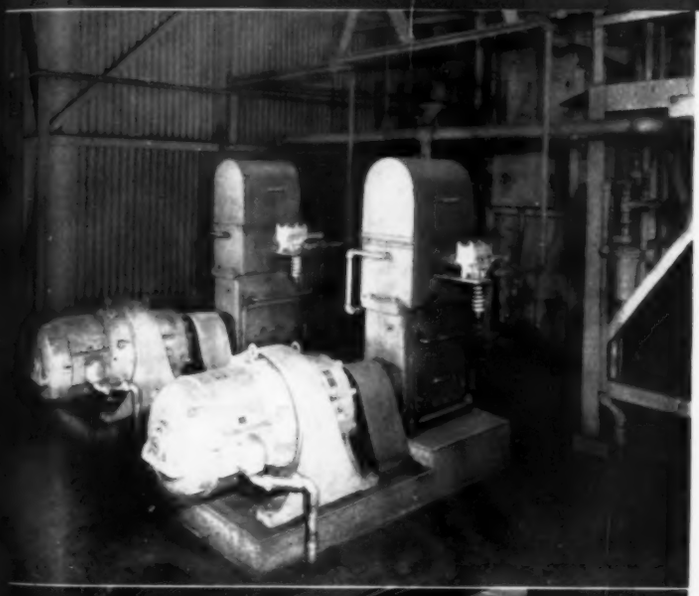
BARTLETT-SNOW
ENGINEERS AND FABRICATORS FOR THE FOUNDRY INDUSTRY

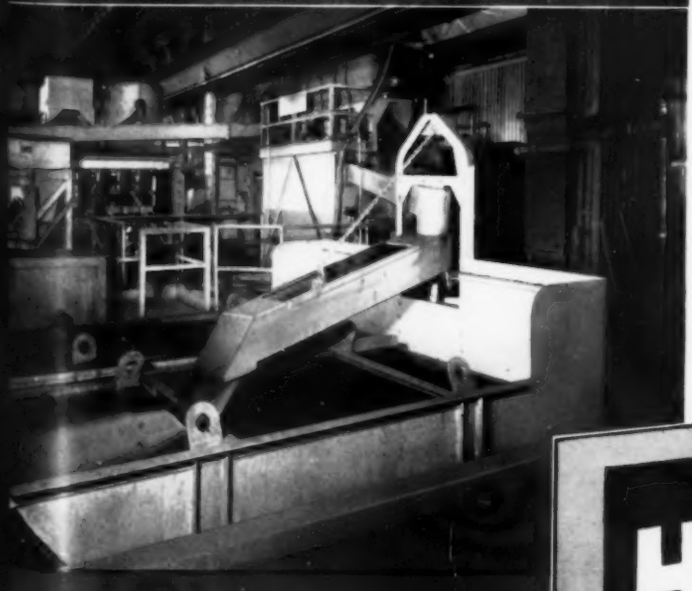
Complete Sand, Mold and Castings Handling Equipment for any requirement, including

Shakeouts	Elevators	Aerators	Sand Distributors	Bins and Feeders	Apron Conveyors	Dust Collectors
						


HYDRO-BLAST

IS THE CHOICE OF TOLEDO MACHINE AND TOOL DIVISION OF E. W. BLISS CO.



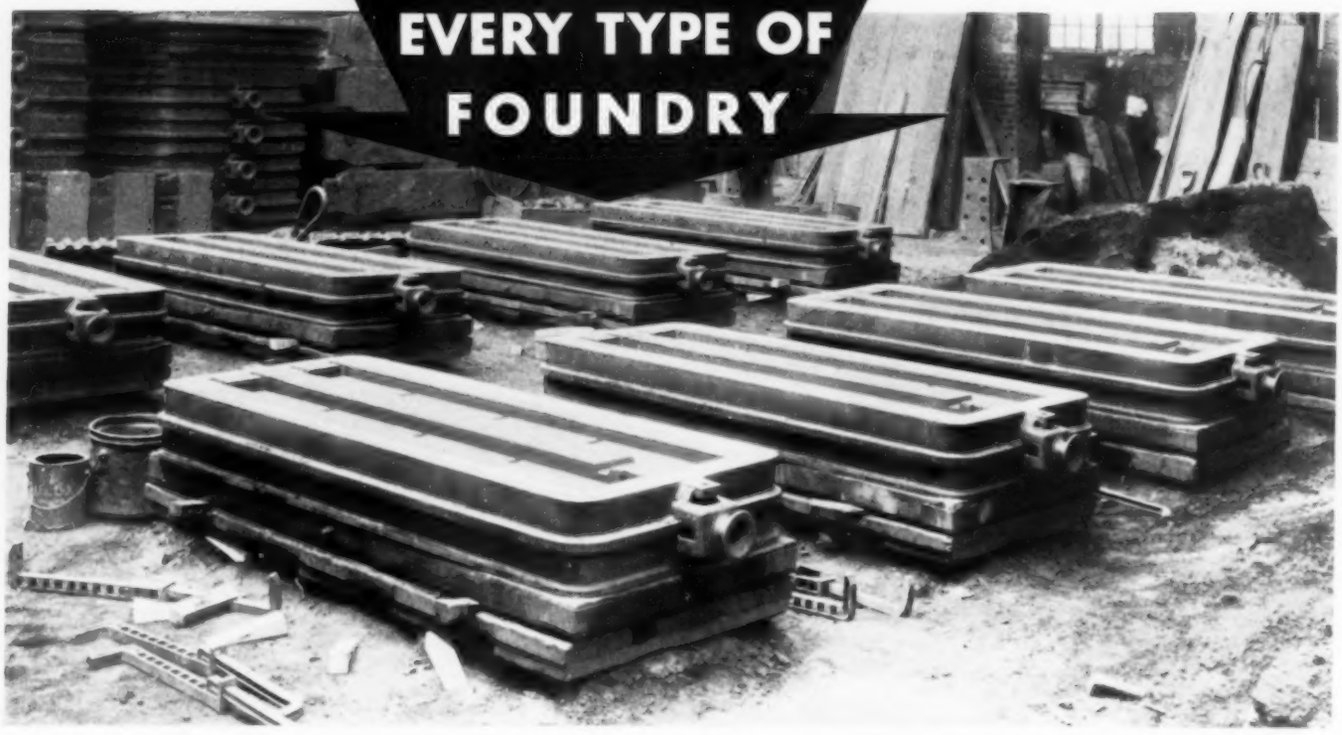


WHY have so many of America's *war important* industries equipped their foundries with the *Hydro-Blast* wet sand and water system for cleaning steel, gray iron, malleable, magnesium and other non-ferrous castings? BECAUSE no other means or method offers comparable advantages and economies. Hydro-Blast cleans castings cleaner; provides more healthful working conditions; permits more accurate sand control; recovers core sand for re-use in better than new condition, at a fraction of the original cost. Brings your source of sand supply right to your foundry floor. Instead of continually buying new sand and transporting it from the pits, Hydro-Blast sand recovery releases those millions of ton miles as a direct easement of the present transportation problem. Likewise it saves gasoline and tires formerly used to carry the waste sand from the foundry to the dump.

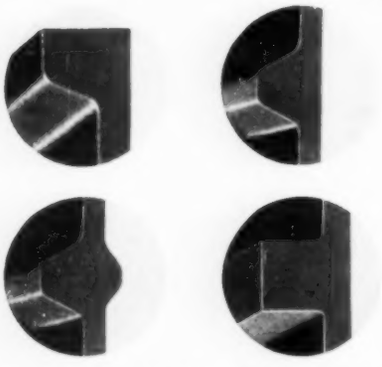
HYDRO-BLAST CORPORATION

2550 N. WESTERN AVE., CHICAGO

EVERY TYPE OF FLASK FOR EVERY TYPE OF FOUNDRY



Speeding PRODUCTION NOW in over 3500 Foundries . . .



All-welded, integral ribs and flanges; solid center reinforcing rib; square flanges; full width bearing, aids speed and accuracy . . . simplifies ramming and shaking out. (Pat. 1974292)

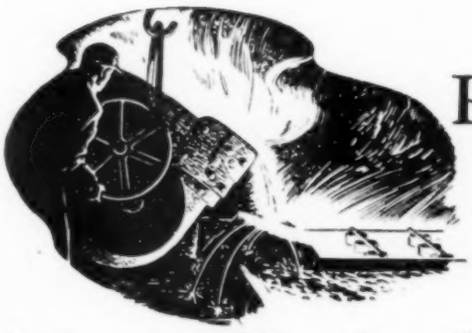
Victories are being won in PRODUCTION NOW for thousands of foundries with STERLING Flasks. Success was engineered into these compact, sturdy flasks *years ago* for the strenuous service they are called upon to perform today. For speed and convenience in operation they have proved themselves unequalled. Their many advantages are helping perform distinguished service in war work. Consult STERLING for complete foundry flask service.

Sterling FOUNDRY FLASKS

Flasks available in all styles and shapes . . . all-welded, special rolled steel sections . . . strong but light, for speed and endurance.

STERLING WHEELBARROW COMPANY • MILWAUKEE, WIS., U. S. A.

A3798-1P



PRODUCTION FOUNDRY Uses "SMZ" ALLOY to make Motor Blocks from Low-Grade Materials...

Ladle Additions of This Balanced Graphitizing Alloy Help Produce a Dense Cylinder Iron With Good Machinability.

GOOD scrap is not available to this foundry, yet it is achieving low-cost production of cylinder iron of 1.80 to 1.85 per cent silicon content and 3.25 to 3.30 per cent carbon. The iron has the necessary machinability and good shrinkage characteristics.

The iron is melted from a charge of 20 per cent malleable pig iron, 30 per cent steel, 20 per cent remelt scrap, and 30 per cent briquetted borings. On occasions, the charge has even included detinned cans. Each 1000-pound charge contains five to eight one-pound "EM" Silicon Briquets.

The iron comes from the cupola at about 2,800 deg. F., and the "SMZ" Alloy is added to the molten stream in the cupola spout. The alloy is apparently completely absorbed in the stream before the metal reaches the ladle. This addition of "SMZ" Alloy produces a machinable iron with freedom from chill even in thin sections.

"SMZ" Alloy is a deoxidizing and graphitizing material containing silicon, manganese, and zirconium. Because of its balanced composition, this alloy produces better results than these metals added separately.

When added to cast iron in the spout or ladle, it produces these beneficial results:

1. It converts a normally hard white iron into a high-strength gray iron.
2. It reduces the chill of gray iron and minimizes wall sensitivity—prevents chilling of thin sections.
3. It produces a better microstructure in the iron, improving strength and physical properties.

•

Our metallurgists will gladly tell you more about "SMZ" Alloy and other "Electromet" ferro-alloys for the foundry. They will give you practical help in using them to advantage. Ask for this service, or write for further information. There is no obligation.

ELECTRO METALLURGICAL COMPANY

Unit of Union Carbide and Carbon Corporation

UCC

30 East 42nd Street New York, N. Y.

Distributed through offices of Electro Metallurgical Sales Corporation in Birmingham, Chicago, Cleveland, Detroit, New York, Pittsburgh, and San Francisco. In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

Electromet
Trade-Mark
Ferro-Alloys & Metals

"EM," "SMZ," and "Electromet" are registered trade-marks of Electro Metallurgical Company.

Quick help on metallurgical refractory problems!

EVERY Metallurgist sooner or later runs into a stubborn problem on refractories. Today particularly, with the emphasis on production, you want a quick answer and the right one. Here's where The Carborundum Company can help.

For more than twenty-five years Carborundum Brand Refractories have been solving many of the metal industry's furnace problems. These refractories have been extended to include over sixty-five standard varieties in regular production and many special modifications thereof to meet unusual conditions, all of which have been proven in service. They are used in the form of muffles, hearths, supports or complete linings in all types of furnaces. Among them may be mentioned furnaces for forging, drawing, tempering, hardening, carburizing and annealing; furnaces for both ferrous and non-ferrous melting.

In addition, you are offered the expert knowledge and practical skill of highly trained engineers to assist you in the proper selection and use of these specialized refractories—to make certain that the right material is used in the right place. They are ready to help you, on short notice. So next time you run into refractory difficulties call in The Carborundum Company. A letter to our nearest branch office will receive prompt attention.

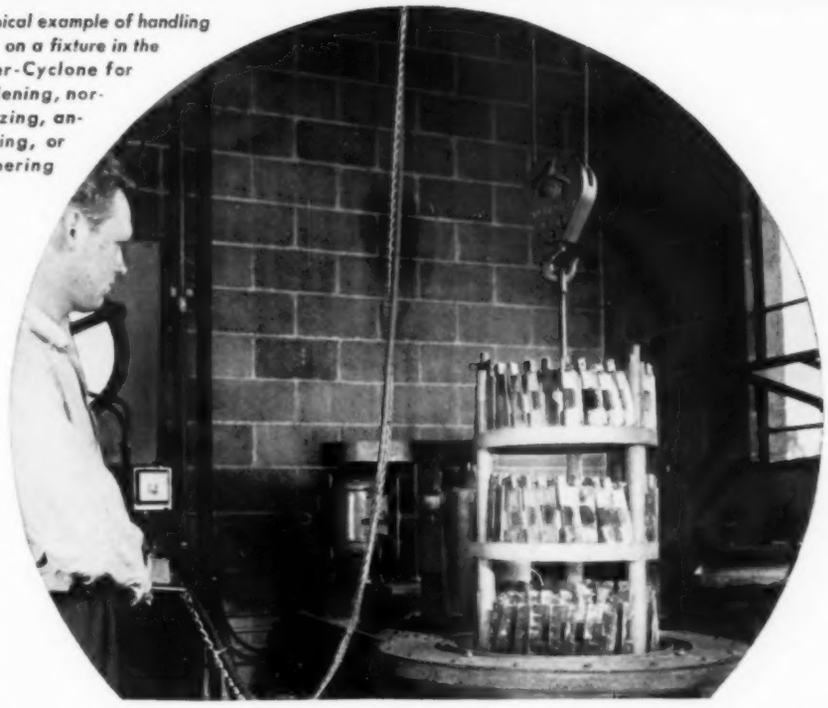
REFRACTORY CARBORUNDUM PRODUCTS

Refractory Division, **THE CARBORUNDUM COMPANY,** *Perth Amboy, N. J.*

REG. U. S. PAT. OFF.

District Sales Branches: Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh. Distributors: McConnell Sales and Engineering Corporation, Birmingham, Ala.; Christy Firebrick Company, St. Louis, Mo.; Harrison & Company, Salt Lake City, Utah; Pacific Abrasive Supply Company, Los Angeles, San Francisco, Calif.; Denver Fire Clay Company, El Paso, Texas; Smith-Sharpe Company, Minneapolis, Minn.

(Carborundum is a registered trade-mark of and indicates manufacture by The Carborundum Company)



A typical example of handling work on a fixture in the Super-Cyclone for hardening, normalizing, annealing, or tempering

INCREASED PRODUCTION ★ STRAIGHTER WORK

REDUCED HANDLING ★ LESS FLOOR SPACE

Get them all with 100% forced convection heating in the

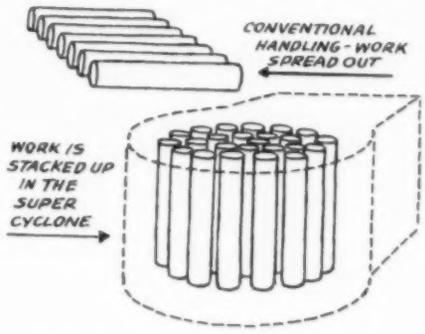
SUPER-CYCLONE

THE NEW HEATING PRINCIPLE embodied in the Lindberg Super-Cyclone combines a hardening, normalizing, annealing, tempering, and nitriding furnace into one. In addition, the 100% forced convection heating principle increases production, turns out straighter work, reduces handling of material, and generally requires less floor space to give all these advantages. And too, due to the heating and control accuracy within its 250°F. to 1750°F. temperature range, the Super-Cyclone is a highly flexible furnace for the small or medium heat treating shop as well as a heavy production unit for the large shop when put to work on one type of job.

REDUCES HANDLING

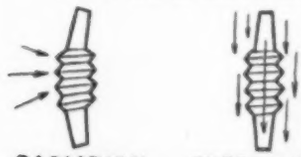
The use of a fixture in the Super-Cyclone eliminates the individual handling of pieces throughout the heat treating process. The parts are loaded onto the fixture and remain there during the heating, quenching, and tempering stages. An added advantage of the fixture is that it can be loaded and unloaded away from the furnace. As a result, the operator is not subjected to high furnace heat as occurs in handling work individually from the box furnace.

INCREASES PRODUCTION



To check the production increases possible in your shop, through the Super-Cyclone, spread an average load of parts on the floor one layer thick, as handled in a radiation type box furnace. Now take another load of those same parts and stack them up in a 36" circle, 4' high, making allowance for spacers and supports. Figure it will take a maximum of 3 hours to heat the stacked up parts and 5 minutes to quench the lot. Ordinarily you will find production increases of from 200% to 1000% possible.

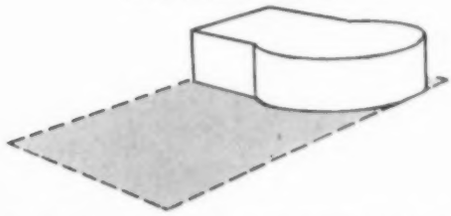
KEEPS WORK STRAIGHTER



The 100% forced convection heating principle of the Super-Cyclone heats the work accurately and uniformly by driving heated air, at high velocity, through the charge. The heat source is confined to a separate chamber, away from the work, thereby preventing heat of a source hotter than the desired work temperature from striking the charge and causing distortion.

Thus, straightening time is eliminated or reduced to a fraction of what is required from conventional equipment. Man hours previously required for straightening are now available for other work.

LESS FLOOR SPACE



As a conservative rule, you can figure that the Super-Cyclone will occupy not more than ⅓ the floor area demanded by any other equipment to handle the same or greatly increased production. This rule is based on averages of what the Super-Cyclone has done in plants all over the country and consequently may not fit all cases.

If you are concerned today with a heavy production schedule, flexibility in your heat treating department, or if your post war plans include economy of operation and maintenance, investigate the Super-Cyclone and all the advantages of its 100% forced convection heating principle. Write for Bulletin 130.

HEAT TREATING HINTS FREE!

Whether the war has brought you into contact with heat treating for the first time or whether you have devoted a lifetime to it, Heat Treating Hints published without charge for heat treaters, offers you valuable "how-to-do-it" information on heating, quenching, straightening, etc.

In the third year of its publication, Heat Treating Hints is read and used by over 8000 heat treaters and metallurgists from coast to coast. Your written request will bring you the latest copy and will place your name on the mailing list for future issues. Write today.

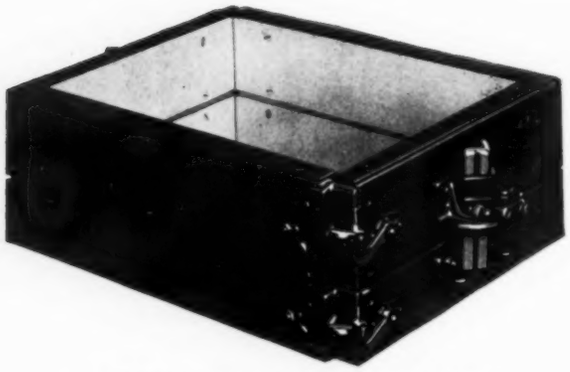
LINDBERG ENGINEERING COMPANY

2453 WEST HUBBARD STREET • CHICAGO

LINDBERG FURNACES

HYDRYZING FOR SCALE-FREE AND DECARB-FREE HARDENING

CYCLONE FOR LOW COST ACCURATE TEMPERING



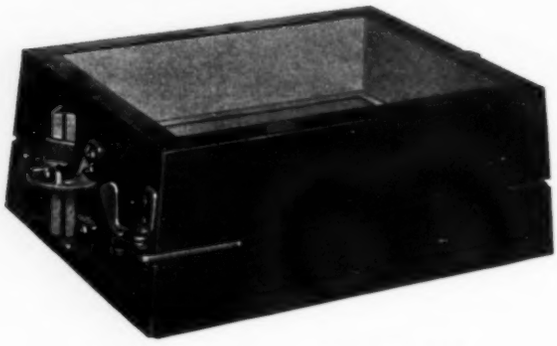
ADAMS CHERRY SNAP FLASKS
Straight or Tapered

Quick Service on Custom-Built Flask Equipment

To be effective, flask equipment should be carefully selected and made to fit the job. Another requirement these days is prompt delivery, as the need for this equipment cannot always be anticipated.

This calls for an unusual manufacturing setup, but it is a procedure that we have mastered in more than forty-five years of flask building.

Adams Flask Equipment—Snap Flasks, Slip Flasks, Jackets and Bands—is made to your order, and we have expanded our facilities to the point where, even under present conditions, we can offer unusually prompt service.



ADAMS CHERRY SLIP FLASKS

ADAMS CAST IRON JACKETS

REMEMBER — *Adams Flask Equipment is also available in round or special shapes to conform with your pattern equipment.*

ADAMS STEEL JACKETS

THE ADAMS COMPA

MOLDING MACHINES · FLASK

Adams Universal Jolt Squeezers

JOLT-SQUEEZE-PATTERN-DRAW TYPE

Here is a simple and compact production unit that operates equally well as a jolt-squeeze-pattern-draw machine or as a plain jolt squeezer.

Adjustable arms on the lift table will accommodate any size of flask within the range of the machine.

Quickly adjusted for 3″, 4″, 5″ or 6″ draw, with rapid setting for any desired speed of lift or drop.

Knee valves are adjustable in height to suit the convenience of the operator.

Two sizes—Stationary and Portable—10″ and 12″ squeeze pistons—32″ and 38″ between side rods. Also available in the post type.

NY · DUBUQUE, IOWA · U.S.A.

K EQUIPMENT Established 1883

WHO WOULDN'T BE WORRIED? I'VE GOT TO TRIPLE OUR TONNAGE!

① **"THAT'S A LARGE ORDER,"** I told this worried foundry superintendent. "It's hard enough to do any time but during times like these, when additional floor space is so scarce to get, it's a tough problem. However, I have a suggestion..."

② **"BREAK IT DOWN** into three separate problems—sand-handling, mold-handling and castings-handling! If you can triple the capacity of these bottlenecks in production, most of your difficulties would be solved, wouldn't they?"

③ **"REX CAN HELP YOU** with all three! Rex sand-handling equipment includes belt conveyors, apron conveyors, elevators, feeders—everything you need for sand conditioning—units whose value has been proved in our biggest foundries."

④ **"AND FOR MOLD CONVEYING,** Rex has the equipment—and, more important, the experience—to design a layout best suited to your floor space, whether your daily output is 100 or 1000 tons. Here's one of our recent mold handling set-ups."

⑤ **"FINALLY,** many production-conscious men have learned that Rex apron conveyors are the finest solution to a castings-moving problem. They're easily installed, trouble-free, rugged as you could wish! That's something to think about, isn't it?"

⑥ **"YOU'VE GIVEN ME SOME GOOD IDEAS,"** he said. "The way you've broken down our problem makes it seem much simpler! If Rex equipment will help us triple this plant's output, we'd better go talk it over with our engineers now . . ."

At the Foundry Show Rex men will be glad to tell you about Rex foundry equipment for iron and steel foundries—conveyors, elevators, feeders, aerators, mold cars, etc. See them there, or write to 1716 W. Bruce Street, Milwaukee, Wisconsin.

REX CONVEYORS

CHAIN BELT COMPANY OF MILWAUKEE

Baldwin-Duckworth Chain Belt Division, Springfield, Massachusetts • Worcester, Massachusetts
Rex Chain Belt and Conveyor Divisions, Milwaukee, Wisconsin

REX CHAIN BELT COMPANY

STAMINA - counts here!

BAY STATE
WHEELS of PROGRESS

Fractional Grades — Controlled Porosity — H9 Vitrified Bond — new improved hydraulic presses — additional scientifically controlled tunnel kiln — constant, rigid laboratory check of raw materials . . . These important steps by BAY STATE assure you of a continued supply of only "thoroughbred" abrasive products to help win your race for better delivery dates and our ultimate Allied victory.

A 64-page booklet containing a wealth of data on grinding wheels and other abrasive shapes is yours for the asking.

BAY STATE

ABRASIVE PRODUCTS CO., WESTBORO, MASS. U.S.A.

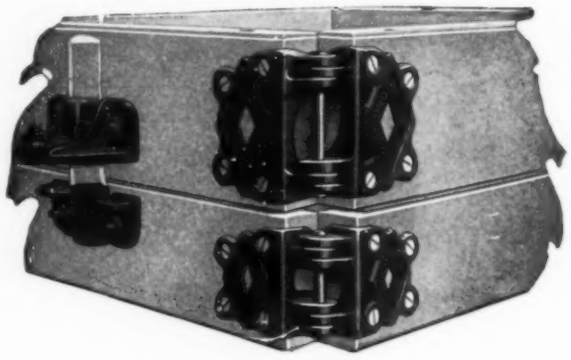
A *Real* INVESTMENT FOR MORE PRODUCTION!

DIAMOND FLASKS

No matter what happens—you'll never be wrong if you equip for production with *good* flasks. Because we can give you many exclusive features in a flask developed over a period of 50 years, it can also be said that, "You can't go wrong on a Diamond," either. Note these important features:

- **A SUPERIOR LATCH** (exclusive)

  It's self-compensating for wear. The tighter you draw it, the firmer the grip. Has special cam which is easily adjustable as extreme wear on parts develops. Only *Diamond* has this patented feature.



- **PRECISION-MADE**

  Made from the finest grade of well-seasoned cherry stock, all flasks are made to precise measurements according to your specifications.

- **A PATENTED HINGE** (exclusive)

  Note the construction of Diamond hinges. The lugs are carefully milled and are interlocking which eliminates "play" no matter how long or how hard the flask is used.

- **SPECIAL SHAPES**

  We regularly supply customers with special shape flasks, including round flasks, and special cut partings.

STEEL JACKETS

Made from Nos. 7 to 10 gauge steel, true to size and taper. Are practically indestructible, and retain their shape under severest conditions. Thousands of these jackets in use.

DIAMOND

CLAMP AND FLASK COMPANY

Telephone 2553 **Richmond, Indiana**

Designers of* CORE PLATES, JACKETS, BANDS, FLASKS *since 1889

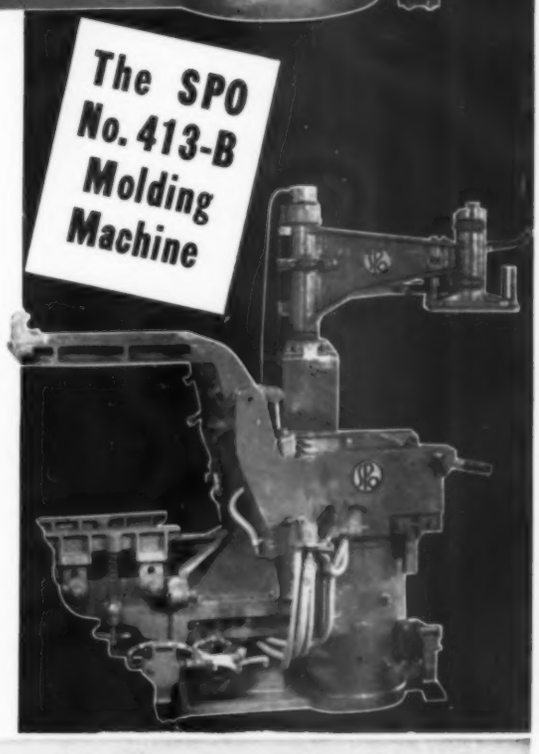
Do it Fast... Do it Right

WITH SPO MOLDING MACHINES

Buying equipment is more than acquiring a certain amount of metal which occupies a fixed floor area, rises so many inches into the air, and weighs a given number of pounds. Any quantity of mere metal may still be scrap. *Experience turns metal into an instrument of both production and profit.*

Illustrated is the No. 413-B stationary Jolt Squeeze Hand Rock-over Pattern Draw Molding Machine. It is designed for high production on work which is too large for match-plates and squeezer machines and yet permits of handling half molds manually. This machine turns out more drag half molds uniformly rammed than any other type of molding equipment we know of. Details:

Squeeze head enables molds to be squeezed without butt ramming. Rock-over table is held rigidly by air in both jolt and pattern draw positions. Smooth, easy roll-over is accomplished by combination of air cylinder and counterbalancing springs. Air clamp, leveling device and pattern draw are air-operated.



Let our long experience as foundrymen fit the proper SPO Molding Machine to your exact needs. No obligation.

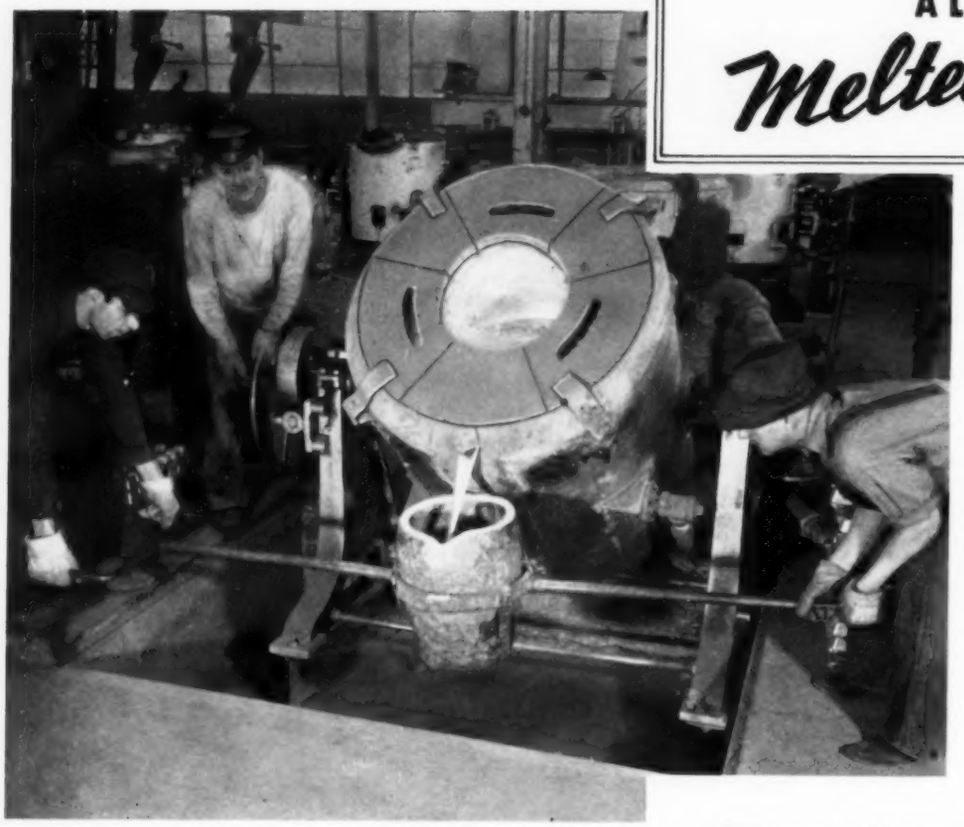
SPO

INCORPORATED

Manufacturers and Specialists in Molding Machines, Vibrators and Patterns for Production

7500 GRAND DIVISION AVENUE • • CLEVELAND, OHIO

ALUMINUM-MAGNESIUM ALLOYS *Melted Faster* IN LONGER LASTING TERCOD CRUCIBLES



Tilting type crucible furnace equipped with Tercod Tilting Crucible, size No. 1400, long lip design, pouring into shank-held Tercod Crucible. Aluminum and magnesium alloy foundry of Aluminum Industries, Inc., Cincinnati, O.

TERCODS are the most widely used Crucibles in the United States for

- ✓ ALUMINUM
- ✓ MAGNESIUM
- ✓ COPPER
- ✓ BRASS
- ✓ IRON
- ✓ OTHER ALLOYS

IT goes without saying that manufacturers of fighting plane parts are scratching their heads for production shortcuts to beat war quotas.

That's why foundries using tilting type furnaces to melt aluminum-magnesium alloys for light metal castings, prefer Tercod Crucibles. Higher thermal conductivity permits faster melting.

And that's not all! Fewer crucible replacements are necessary when Tercods are on the job. Users attest to their longer life.

Tercod Crucibles are composed mainly of carbon bonded silicon carbide, with only a minimum amount of critical, imported material.

ELECTRO REFRACTORIES AND ALLOYS CORP.

GENERAL OFFICES: ANDREWS BUILDING, BUFFALO, N. Y.

Manufacturers of Crucibles, Alloys, Stoppers, Refractories, Grinding Wheels

Fanner

THE NAME
for
QUALITY
AND
SERVICE
in
CHAPLETS
AND
CHILLS

THE FANNER MANUFACTURING CO.

BROOKSIDE PARK CLEVELAND, OHIO

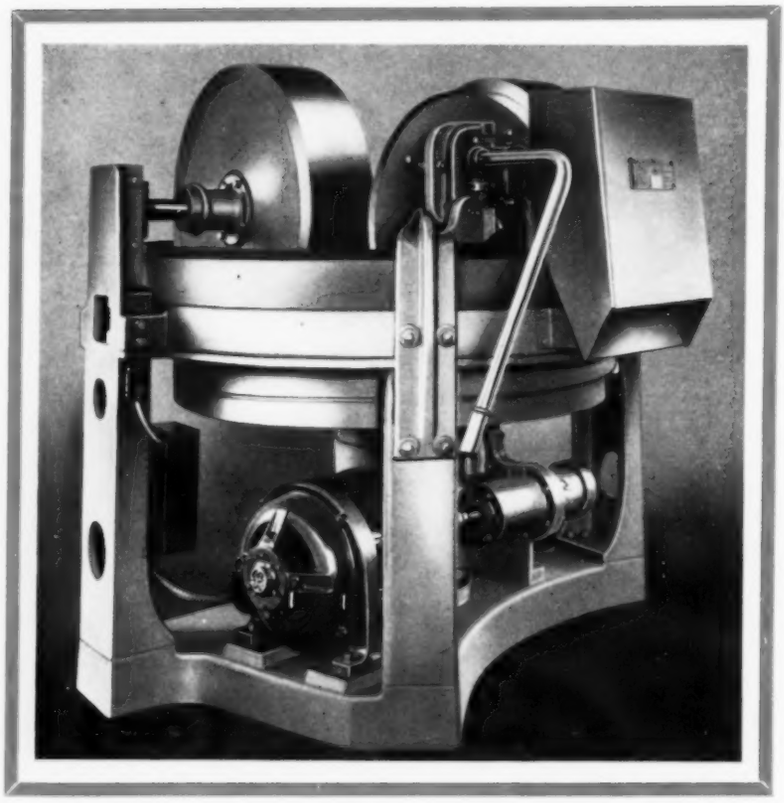
CANADIAN FANNER, LTD.
HAMILTON, ONTARIO

A LETTER TO

CLEARFIELD

MIXER USERS

In these days your machinery is doubly valuable. Protect it. Your CLEARFIELD Mixer is designed and built to give you continuous, efficient service,—just how good is largely up to you. Here are a few suggestions:



1. Keep out tramp iron. We've provided our machines with certain automatic safeguards for their protection when an occasional gagger or other bit of metal gets into the sand. Any of this is undesirable and it might cause damage. Better prevent than cure.

2. You're probably running your CLEARFIELD longer hours each day. Are you sure your maintenance man is stepping up his lubrication to keep pace? The best lubricant and plenty of it is cheap insurance for uninterrupted production.

3. Inspection and adjustment of working parts always pay dividends. The CLEARFIELD Mixer doesn't have many parts to get out of whack — all the easier then to concentrate on those that might. The Timken Anti-friction bearings, for example, will run almost indefinitely if kept lubricated and adjusted.

4. Don't *put off* making necessary adjustments. "Do it now" is a mighty valuable motto.

5. Remember that we are back of you, both with prompt service on repairs and with advice for preventing or eliminating trouble. We are just as much interested as you are in knowing that your CLEARFIELD is giving you the efficient uninterrupted service of which it is capable.

YOURS FOR VICTORY

CLEARFIELD MACHINE COMPANY

CLEARFIELD PENNSYLVANIA, U. S. A.

Mr. Foundryman-
You can just as well have the RIGHT bonding clay to suit your exact needs — without paying a cent extra. ECP's SEVEN full-time service engineers have FIVE different bonding clays and their many combinations from which to recommend the one correct solution. No cost — no obligation.
EASTERN CLAY PRODUCTS, INC.
EIFORT, OHIO

DIXIE BOND · BLACK HILLS BENTONITE · REVIVO BOND · REVIVO SUPER BOND · BALANCED REVIVO

ECP *All* TYPES OF BONDING CLAYS

A Foundry Sand Service Based Upon Practical Research

TABOR
TRADE 1884 MARK

JAR SQUEEZERS ★ ★

FOR FAST AND EASY OPERATION

1 TOP SQUEEZE TYPE—Swing head mounted on a ball thrust bearing. Jarring table is centered directly over its support. Furnished in stationary and portable types.

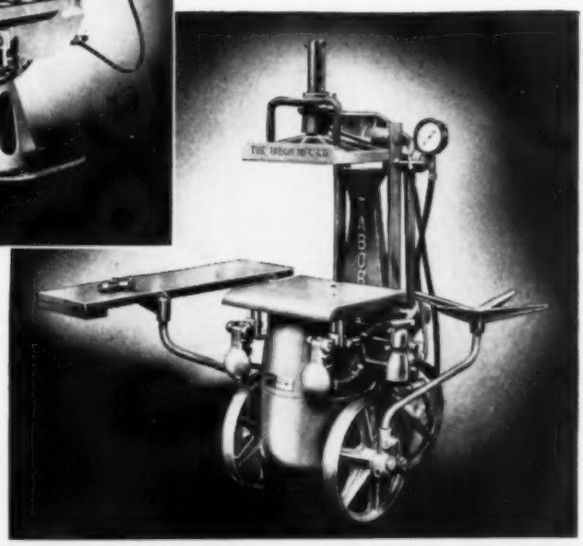
2 CANTILEVER TYPE—A light portable machine with squeeze cylinder in the base. Cantilever squeeze yoke leaves machine open at the sides. Easy movement to and from squeezing position.

3 YOKE TYPE—Squeeze cylinder in base. Open at back to accommodate wide flasks. Counterbalanced spring adjustment for changed weight as yoke is raised or lowered to handle shallow or deep flasks.

4 COLUMN TYPE—10-inch diameter squeeze cylinder in base. Open at sides. Easy swing.

In addition to the standard Tabor machines shown, we also build machines for special work or unusual conditions, combining the functions of different types. Write for descriptive bulletins.

1



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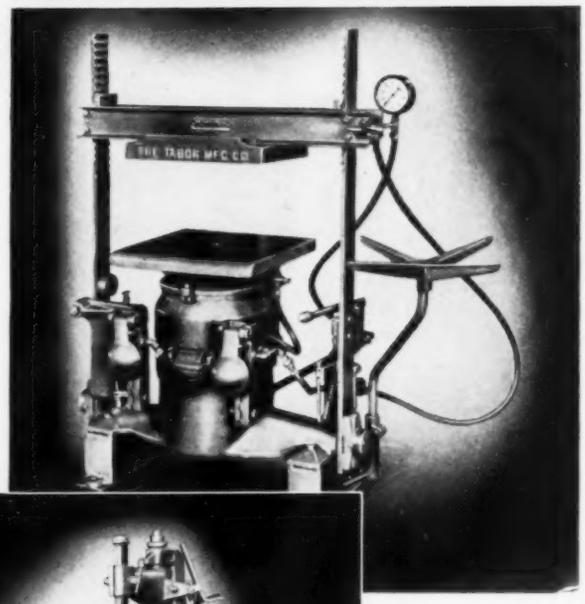

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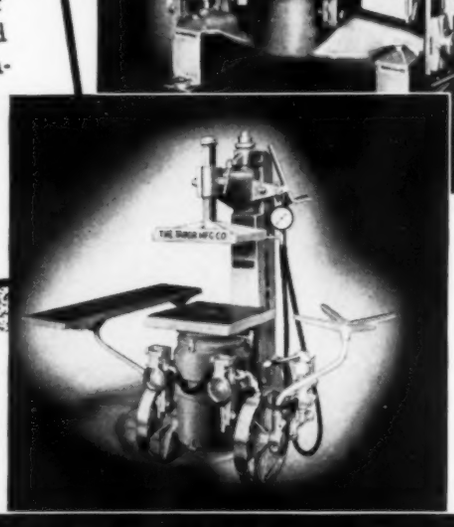
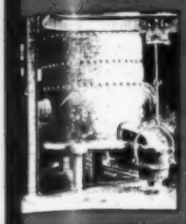


4

THE TABOR MANUFACTURING COMPANY
6225 Tacony Street • Philadelphia • Pennsylvania

Representatives: Snyder Foundry Supply Co., *Los Angeles, Calif.;* Pacific Graphite Works, *Oakland, Calif.;* Carl F. Miller & Co., *Seattle, Wash.*

What is the capacity of



CUPOLAS

ELECTRIC FURNACES

CRUCIBLE FURNACES

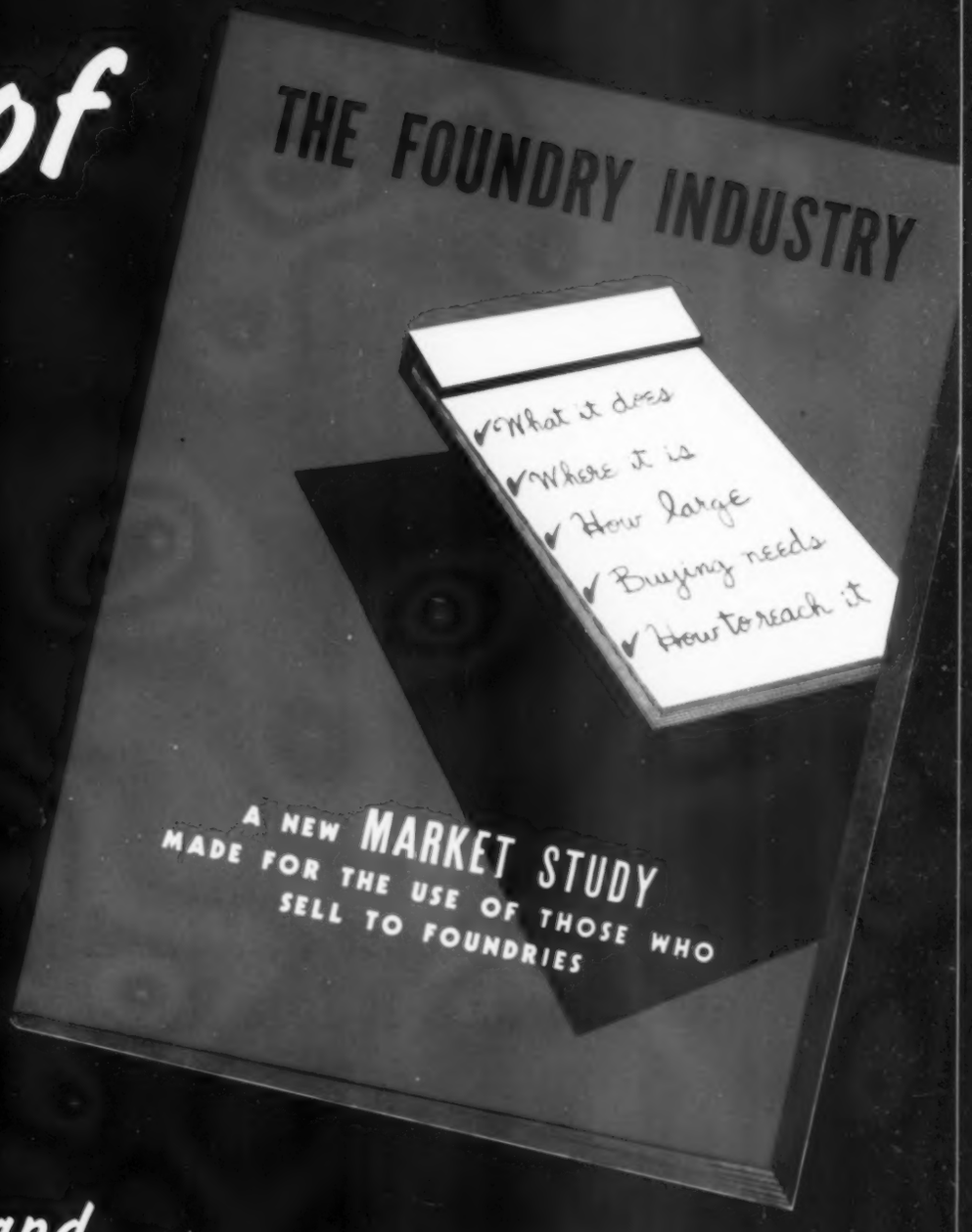
NONCRUCIBLE FURNACES

OPEN HEARTHS

CONVERTERS

AIR FURNACES

ROTARY FURNACES



and... how many melting units are there?

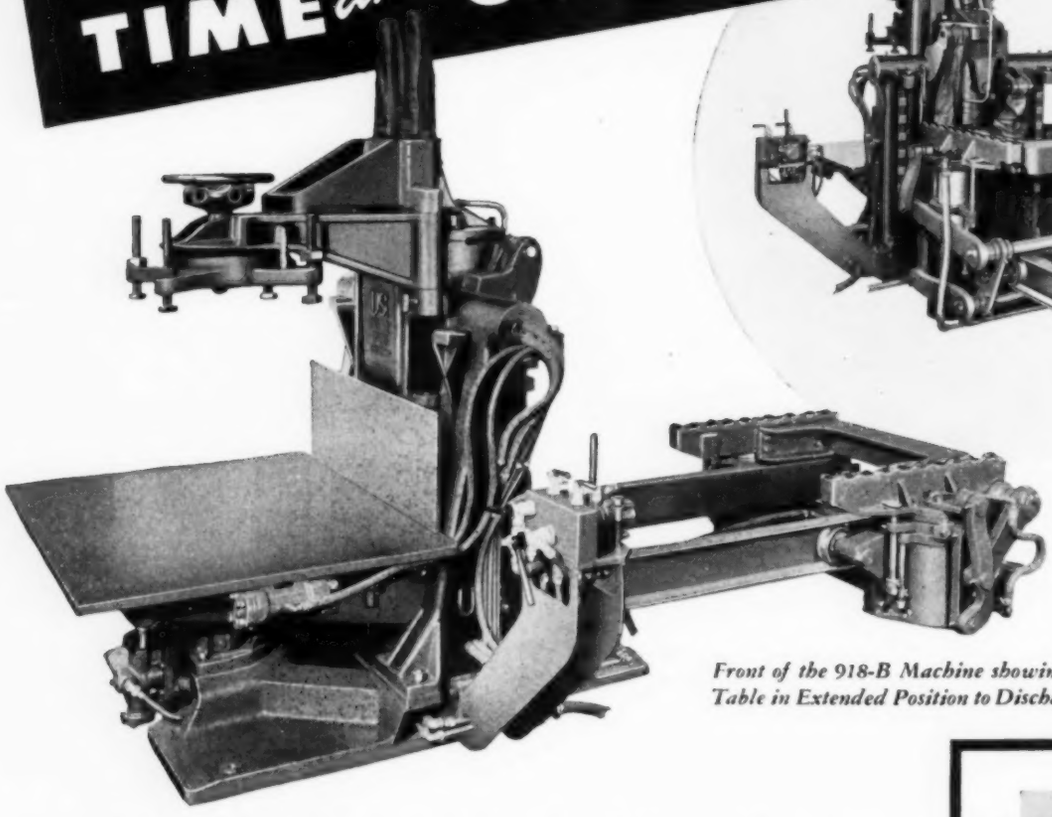
In times like these capacity is an exact index to an industry's requirements . . . Capacity of the Foundry Industry is broken down by kinds of metal poured, types and number of melting units, and size of the industry by geographical location in this new market study . . . For an accurate basis of determining the Foundry Industry's market and requirements get your copy of "The Foundry Industry" today . . . Write . . .

Wherever Metals Are Cast . . . You'll Find . . .

THE FOUNDRY

PENTON BUILDING • CLEVELAND, OHIO

CUT MOLDING TIME *and* COSTS



Back of the 918-B Machine showing the Roll-out Table in Raised Position to Receive the Mold.

Front of the 918-B Machine showing the Roll-out Table in Extended Position to Discharge the Mold.

with Johnston & Jennings New No. 918-B Jolt Roll-Over Pattern Draw Machine

• This machine requires no pit and is of open end construction. It has a shockless jolt, free from rebound, and a perfect draw. An air operated clamp in the center of the table adjusts itself automatically for various height flasks and the automatic adjustable roll-out conveyor delivers the completed mold at the required height assuring accurate, uniform and speedy molding. This machine has a 44″ x 54″ table—20″ pattern draw and 2000 lb. capacity. Write today for descriptive catalog giving full information of this and other Johnston & Jennings molding machines.

THE JOHNSTON & JENNINGS COMPANY

867 ADDISON ROAD • CLEVELAND, OHIO

A COMPLETE LINE PROVEN IN SERVICE INCLUDING—

PLAIN AIR JOLTS
in 12 different sizes

JOLT SQUEEZERS
fast sturdy machines—3 sizes

JOLT STRIPPING PLATES
4 sizes ranging up to 16″ draw

JOLT, SQUEEZE, STRIPPING PLATE AND PATTERN DRAWS
Popular for medium service—2 sizes

PORTABLE JOLT ROLL-OVER AND PATTERN DRAW
A heavy duty thoroughly dependable machine—portable

JOLT ROLL-OVER AND PATTERN DRAWS
Fast large capacity machines with roll-out conveyors—4 sizes

Write for fully descriptive catalog giving complete specifications.

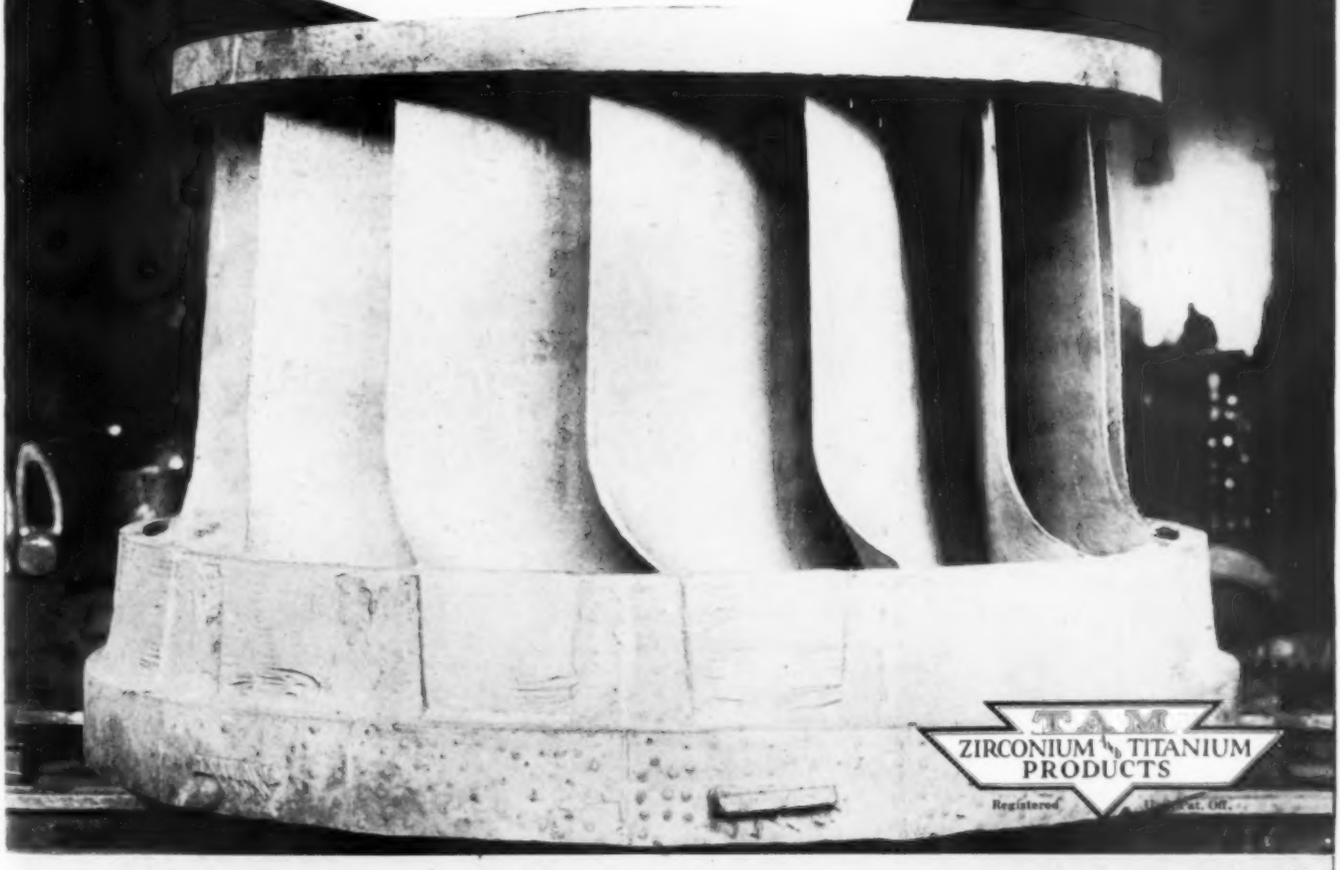
SMOOTH FACES FOR CASTINGS

TAM Zirconite super-refractory mold and core washes produce smoother surfaces and reduce cleaning costs

By resisting the burning-in of the molten metal, TAM Zirconite Mold and Core washes speed up output of good castings by reducing the number and time of cleaning and finishing operations. Available in three grades: Zirconite A has a melting point above 3775° F.; Zirconite B has a melting point above 3600° F.; and Zirconite C, for special uses, has a melting point above 3600° F. They are quickly mixed by adding to water, and can be applied by either spraying, swabbing or painting on cores and molds. Write for complete details, today.

TITANIUM ALLOY MANUFACTURING COMPANY

Zirconite Wash was used on this 94,000 pound .30-.35 carbon steel casting—11'6" high 14' diameter. Of special interest is the fact that no nails were used in the facing.



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"Get in the Scrap"

with DINGS MAGNETIC SEPARATORS

• Dings High Intensity Magnetic Separators can help you speed up reclamation and conservation, help you to get more and more vitally needed metal to fill the hungry maw of all-out war production.

Reclaiming iron from the waste pile, from foundry sand, from slag . . . separating ferrous and non-ferrous scrap . . . taking iron out of reclaimed non-metallics . . . concentrating ore . . . handling scrap and other metal—these are a few of the jobs Dings Magnetic Equipment can do to help.

Write to Magnetic Separation Headquarters today—and ask for a copy of The Magnetic Alchemy Bulletin.

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World's Largest Exclusive Builder of Magnetic Equipment—Established 1899

Follow the ERIE PLAN!

THE ERIE PLAN of Industrial Conservation set up by the leading manufacturing interests of Erie, Pa., has received full endorsement of the Bureau of Industrial Conservation of the War Production Board and is rapidly becoming a model plan for other industrial centers. Designed to salvage and reclaim every possible pound of critical materials including iron and steel, non-ferrous metals, rubber, woolen, cotton, wood, burlap and miscellaneous materials, the Erie Plan has sent salvage managers into every nook and cranny of their plants to ferret out waste materials that can be used to help win the war.

You, too, can Get in The Scrap with a salvage system that will pay you and your country well. Do it now—time means everything.

Dings MAGNETIC SEPARATION HIGH INTENSITY

25 YEARS EXPERIENCE

The

NORTH AMERICAN MANUFACTURING COMPANY

MANUFACTURERS OF INDUSTRIAL FUEL BURNING EQUIPMENT FOR GAS OR OIL

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"Probably not this year, but perhaps a happy memory or an anticipation of a better future."

Ohio Ferro-Alloys Corporation
Canton, Ohio

Ask the SCHUNDLER Technical Men *about* BENTONITE

When you have a question about Bentonite and its use . . . present it to the Schundler technical staff, the largest scientific staff working in the best equipped laboratory in the Bentonite industry. Your questions will be courteously and conscientiously answered.

In using Schundler Bentonite, you are sure not only of technical service but also of a strictly first quality product and the experience of a pioneer producer.

PAUL S. DENNING
Research Director

FRANCIS COBB
Research

AMEL AMBERSON
Control

Many Products for Foundries

Other items in the fast-growing line of Schundler products for Foundries are:

FESCO FIRE CLAY—A top quality fire clay for cupola linings and ladle linings.

FESCO BOND—A bonding clay of the first order. Excellent record of performance.

TALC (SOAPSTONE)—Equal in quality to the best imported products.

Now is a good time to present your problems to Schundler technical men. They can help you meet urgent war requirements.

24 Hour Service

TO MOST FOUNDRY CENTERS

Akron, Ohio	H. S. Stoller
Birmingham, Ala.	Foundry Service Co.
Boston, Mass.	Klein-Farris Co., Inc.
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Chicago, Ill.	B. J. Steelman
Chicago, Ill.	Wehann Abrasive Co.
Cincinnati, Ohio	Delhi Foundry Sand Co.
Coldwater, Mich.	The Foundries Materials Co.
Detroit, Mich.	The Foundries Materials Co.
Dallas, Texas	Barada & Page, Inc.
Edwardsville, Ill.	Midwest Foundry Supply Co.
Houston, Texas	Barada & Page, Inc.
Kansas City, Mo.	Barada & Page, Inc.
Long Island City, N. Y.	F. E. Schundler & Co., Inc.
Los Angeles, Cal.	Independent Fdy. Supply Co.
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St. Louis, Mo.	Midwest Foundry Supply Co.
Oakland, Cal.	Industrial Supply Co.
Seattle, Wash.	Carl F. Miller & Co.
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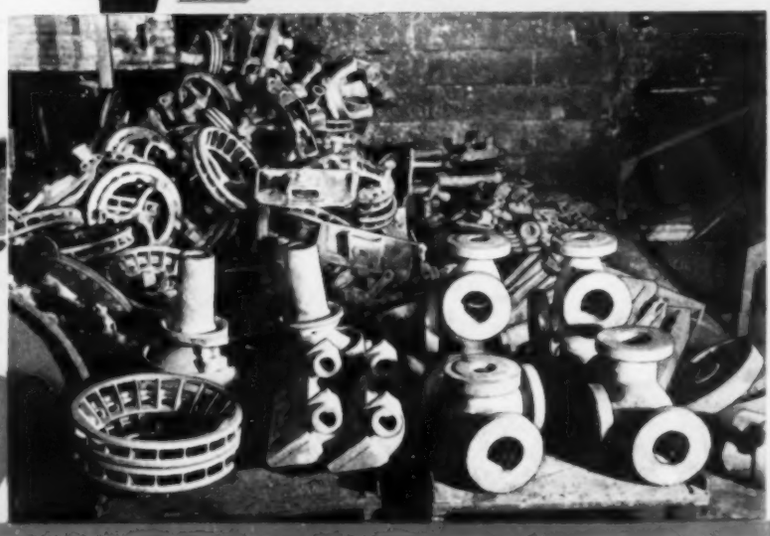
Schundler

Below: The 48" x 48" WHEELABRATOR Tumblast installed at the same steel foundry for cleaning part of their heavy production.

Above: This is an illustration of the 48" x 72" WHEELABRATOR Tumblast used by the steel foundry mentioned in the advertisement.

Below: Steel castings produced by this jobbing foundry include tractor wheels, large valve bodies, heavy spindle hubs, etc.



How

WITH

SPEED UP PRODUCTION

WITH Airless WHEELABRATOR

A PROMINENT STEEL FOUNDRY LICKED ITS CLEANING PROBLEMS WITH WHEELABRATORS

This steel foundry, located in Chicago, has a monthly output of 800 tons. Two WHEELABRATOR Tumblasts (48" x 48" and 48" x 72") clean the entire production plus 85% of this work again after annealing — ***making a total cleaning production of more than 1400 tons monthly.***

LOADS range from 400 lbs. to more than 2000 lbs. each.

CLEANING TIME ranges from 4 to 9 minutes for rough cleaning with sprues and heads — 8 to 15 minutes after annealing.

Quick FACTS ABOUT THE PERFORMANCE OF THESE MACHINES

48" x 72" Wheelabrator Tumblast

Only 8 minutes for removing annealing scale and 4 to 5 minutes for rough cleaning are required on average loads weighing from 1,000 to 2,000 lbs. Typical loads are made-up of work like the following pieces:

12 large tractor wheels about 2' in diameter and 4" thick, weighing 80 lbs. apiece.

5 spindles weighing 170 lbs. each, 18" high, 2' in diameter at the base, tapering to a 5" shaft.

10 four foot long "L" shaped bars, 8" base, 6" high, weighing about 100 lbs. apiece.

6 huge valve housings weighing about 200 pounds apiece.

A load of small solid, uncored and ungated pieces which make a compact mass will weigh as high as 3,000 to 4,000 lbs.

48" x 48" Wheelabrator Tumblast

This machine is rated at approximately half the capacity of the 48" x 72". It is helping to produce the tremendous tonnage cleaned each month at this plant. The cleaning speed of this machine ranges from 12 to 15 minutes for removing annealing scale and from 8 to 9 minutes for rough finishing. Weight of loads depends upon the size and type of work being cleaned.

DO YOU KNOW THAT

10,000 pounds of green and annealed large steel castings are cleaned every hour in a 48" x 72" WHEELABRATOR Tumblast at a prominent Cicero, Ill., malleable and steel castings company. A 2,000-lb. load of green castings is cleaned in approximately 8 minutes and the annealed work in 12 minutes.

●

When the Plainville Castings Co., Westfield, Mass., installed their 36" x 42" WHEELABRATOR Tumblast for cleaning gray iron castings the machine cleaned in 8 hours' time work that had previously required 24 hours to handle in their old rolling barrels.

●

Cutting tools last longer and require less frequent grinding at Red Jacket Mfg. Co., Davenport, Iowa, because they cut metal only—not scale and sand—when they machine their Wheelabrated castings.

●

The installation of a 48" x 48" WHEELABRATOR Tumblast at Hartford Electric Steel Co., Hartford, Conn., resulted in a 75% cleaning room labor reduction and greatly decreased the time required for the removal of gates and risers due to cleaner castings.

TRADE MARK
THE AMERICAN MOLDER
REG. U. S. PAT. OFF.

AMERICAN FOUNDRY EQUIPMENT CO.
BLAST CLEANING AND DUST CONTROL ENGINEERS
505 SOUTH BYRKIT STREET • MISHAWAKA INDIANA

SPEED CLEANING

Shall War Plants Shut Down?
Shall Men be Laid Off?
Shall Our Soldiers Die?

—ALL BECAUSE YOU DIDN'T SALVAGE ALL YOUR SCRAP IRON AND STEEL?

Unless the steel industry gets 6,000,000 *EXTRA* tons of scrap iron and steel this year, it cannot produce *all* the steel required for our war production program.

It's a serious situation. Because about half of the steel in every tank, airplane, ship, gun and shell comes from scrap—approximately 50% of every charge into an open-hearth or electric furnace is scrap.

There's a lot of scrap iron or steel in or around every plant or shop. Old, obsolete, idle machines—old line shafting and pulleys—broken or worn-out dies, jigs, templates, rolls, patterns, molds, tools, gears, cams, fixtures, trucks—old pipe, valves, radiators—idle water tanks and supports—unused smoke stacks and other structural items—anything made of iron or steel which has lost its value in its present form. Don't overlook the scrap at home, too.

Dig it out. It's *urgently* needed—to keep war production flowing—to keep men at work—to protect our soldiers against the enemy.

Put a competent man or a committee to work on a special campaign of your own. Tell *every* man in your plant how important scrap is today. Post this story on your bulletin board, (we'll gladly send reprints). Pile up every piece—no matter how small. You'll be surprised at the amount you find. Then call your nearest junk or scrap dealer. He'll buy it from you—and send it on its way to a steel mill.

If you and every plant does this *PROMPTLY*, you'll be helping to hasten the end of the war—you'll be helping to save the lives of those who fight for you.

REPUBLIC STEEL — PRODUCTION FOR VICTORY

This Advertisement Sponsored by

REPUBLIC STEEL CORPORATION

General Offices: Cleveland, Ohio

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In Cooperation with the U. S. Government's Salvage Campaign

Problems of Meeting Demand for Castings Require Overall Consideration

SEVEN Months of war have accentuated greatly the pattern of foundry production developed during the peroid of the defense effort. The majority of foundries are finding pressure for delivery of castings increasing daily; the remainder are having difficulty staying in business. Companies making castings to be used for machines of war, for equipment employed by industries doing war work, or for the manufacture of transportation facilities, have experienced a steadily growing demand for their products. On the other hand, foundries making castings for use in the manufacture of civilian goods have been forced to curtail operations, due to various restrictions provided to conserve critical materials, especially metals.

In general, requirements for cast steel, heavy gray iron, and aluminum and magnesium castings for aircraft continue to exceed available production capacity, in spite of the sizeable building program under way for some time. Production of steel castings for the first four months of this year was more than double the output in the similar period three years ago, and the monthly production totals continue to climb as new plants and additions are brought into operation. Further expansion is under way, and that scheduled for completion this year will have a monthly capacity in excess of the average monthly production of all steel foundries in 1940. A small part of the increase in facilities has resulted from the conversion of a few malleable and gray iron plants to the production of steel castings.

Although the capacity to produce heavy gray iron castings has been increased considerably, and every effort now is being made to make maximum use of all facilities making such castings, difficulty in placing orders seems to be growing. In the aluminum and magnesium field, a substantial plant construction program now is being augmented with plans to convert a number of specialty iron production shops to the pouring of needed light metal castings.

As the military services apply the knowledge gained in battle to improvement of war equipment, more castings will be needed. Progress in the properties of castings made over the past few years, coupled with almost startling developments in practices and product during the present emergency, provide engineering products that cannot be ignored in the design of new war equipment.

If foundries are to meet both quantity and time requirements in the production of these castings, an honest effort must be made to correlate the many ramifications of the problem with available foundry capacity in all five industry branches. Initiative for this must come from the war agencies in Washington.

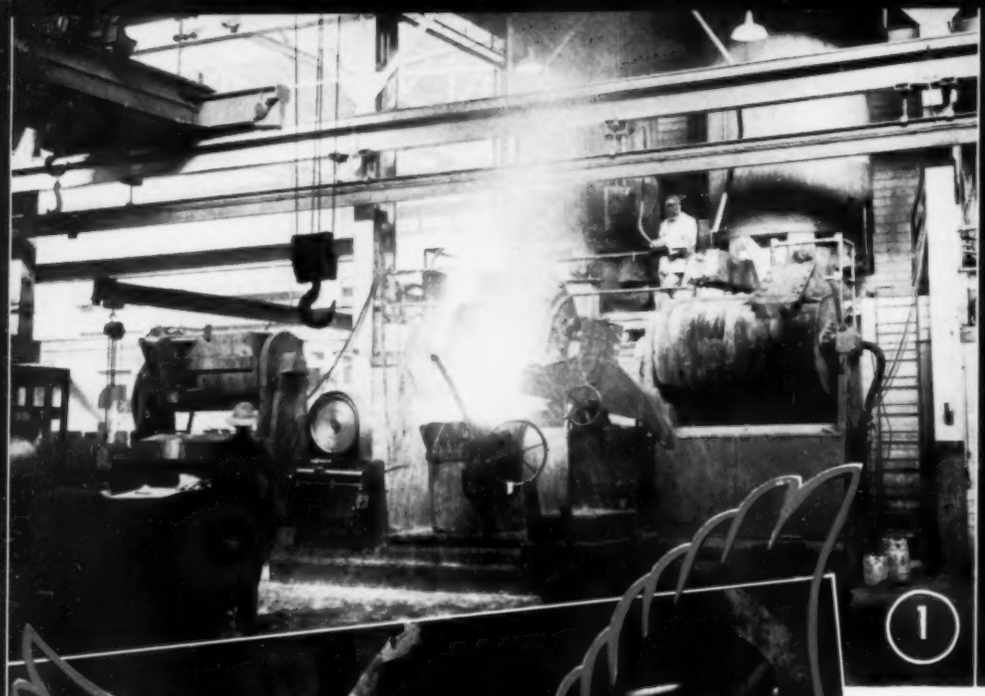
In the selection of castings to satisfy particular needs both ability to meet service requirements and availibility of production capacity must be considered. To relieve some of the pressure on steel foundries and at the same time speed production, more extensive studies should be made to determine the feasibility of temporary substituting gray iron, malleable iron or pearlitic malleable castings for steel castings in certain applications. If substitution is impossible, conversion of well selected iron foundries to the production of cast steel through the installation of the converter and other necessary equipment should be considered by WPB.

At the same time, every effort should be made to complete expansion programs now under way by the end of this year. If necessary to finish the job by that time, special help in expediting the necessary materials and machines should be provided by Washington.

As a service to the nation, the entire problem of castings production now should be considered from the standpoint of a single industry.

Frank G. Steinebach

Editor



WAR DEMANDS SPEED POURING

MACHINE tools are the backbone of practically all war industries. From the first days of the defense program until the present, production of machine tools has grown by leaps and bounds, and still the industry is unable to keep up with the tremendous demands.

Castings, ranging in size from the heavy bases to the lighter machine parts, are most essential in the production of machine tools. To supply the mounting needs, numerous new foundries have been built for the production of machine tool castings, numerous foundry additions have been made, and most of the avail-

able capacity for the production of heavy castings has been directed toward machine tool work. The illustrations on this and the following four pages were taken in the plant of a large midwest machine tool manufacturer, and represent some of the latest features of modern practice.

Fig. 1—View from in front of the cupolas showing the molten metal from the cupola spout running into a barrel type, covered mixing ladle. From the mixing ladle the metal is poured into the transport ladle which carries the metal to the mold. Fig. 2—As the iron runs down the cupola spout a special ingredient is added to the stream through the funnel and pipe at the left. Material added aids in producing a uniform product with predetermined properties suitable for machine tools. Fig. 3—An overhead crane runs the full length of the raw material storage yard. Those shown from front to back include limestone, pig iron, cast scrap and sand. The first three are distributed by the crane to bins under the foundry roof from which they are weighed automatically into buckets in the charge make-up pits. Fig. 4—Molten iron flows down a channel along the top of this mold from which it is distributed through branches to the several gates along the sides entering the mold cavity. Fig. 5—Pouring a large mold requires skill and judgment to maintain the proper flow of molten metal so that the gate is choked at all times. The man at the left is using a skimmer to hold back the slag and other extraneous material so that it does not enter the pouring basin, and then be carried into the mold. Fig. 6—General view of one of the pouring floors showing the numerous overhead and bracket type cranes available to cover the area. As may be observed every square foot of floor space is occupied with molds and equipment. Fig. 7—Molten iron from the elongated, barrel type mixing ladle is poured into smaller ladles which carry it to the mold side. The small ladles rest on a scale for weighing the metal to insure that the exact quantity for pouring a definite mold is available

OF MACHINE TOOL CASTINGS

OEM Defense Photos By Palmer

Fig. 10—Making a mold for a machine tool casting is more exact than many a work of art since it requires exacting precision to produce parts that are interchangeable. This illustration shows a rollover molding machine at the left for making a small part. The pattern on the machine platen just has been withdrawn from the mold shown in the center. The mold will be shifted onto the conveyor in the foreground to travel on its way, and then the pattern will complete its rotation, coming to rest face up where the mold now is shown. It then is ready to receive a flask for production of another mold

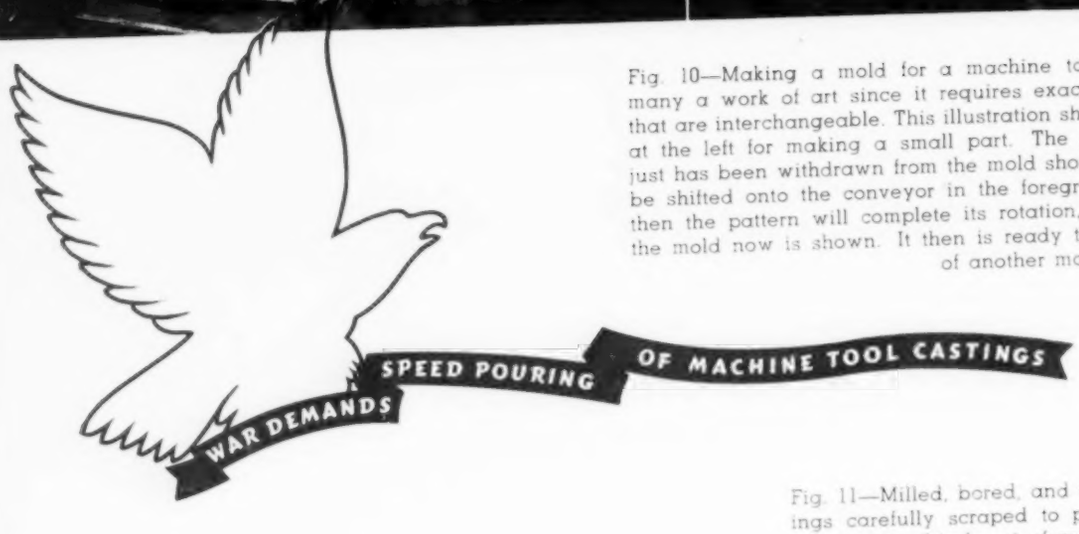


Fig. 8—Insulated, barrel type ladles suspended from a monorail and handled by one man are used for pouring small molds as shown in this illustration. He controls pouring with the lever at the left and the bail at the back. The molds shown in this view may contain hand wheels or other small parts for machine tools. Fig. 9—After the cores are knocked out and the castings are cleaned by abrasive blasting, they are sent to the chipping floor for further finishing. This workman is using a pneumatic chipping hammer and chisel bit which with rapid-fire strokes trims off the rough edges resulting from fins formed at the mold joints due to slight inequalities of the mating surfaces

Fig. 11—Milled, bored, and with their flat and v-shape bearings carefully scraped to provide smooth sliding ways for other parts, this forest of machine tool castings waits at the head of the assembly lines. An idea of the variety of shapes and sizes is evident in this photo. Fig. 12—Fresh from the shakeout pit where the mold is broken up and the sand returned for reconditioning, the castings go to the core clean-out room where the cores are removed with pneumatic and sledge hammers, vibrating machines and powerful hydraulic jets. Notice the core wires and arbors which are used to reinforce the core sand to withstand the pressure of the molten metal. Fig. 13—Seated in the cab of a monorail crane this workman shuttles back and forth between the charge make-up pit and the charging doors of the cupolas, three stories above the ground

Fig. 14—Cranes do most of the lifting in the foundry, and the massive chains are required to handle the heavy flasks and castings. Fig. 15—Not only the materials which go into the cupolas but also the molding and core sands used in the production of high quality iron castings must be examined and controlled rigidly. The whole problem is essentially one for the chemist and metallurgist, so the laboratory, literally part and parcel of the cupola department, is constantly checking and rechecking while the metal is being melted and poured. Fig. 16—In this pile of scrap cast iron there are old machine tool beds, foundry flasks, pipe, boilers, automobile engine blocks, and numerous other parts which are handled with a crane operated magnet

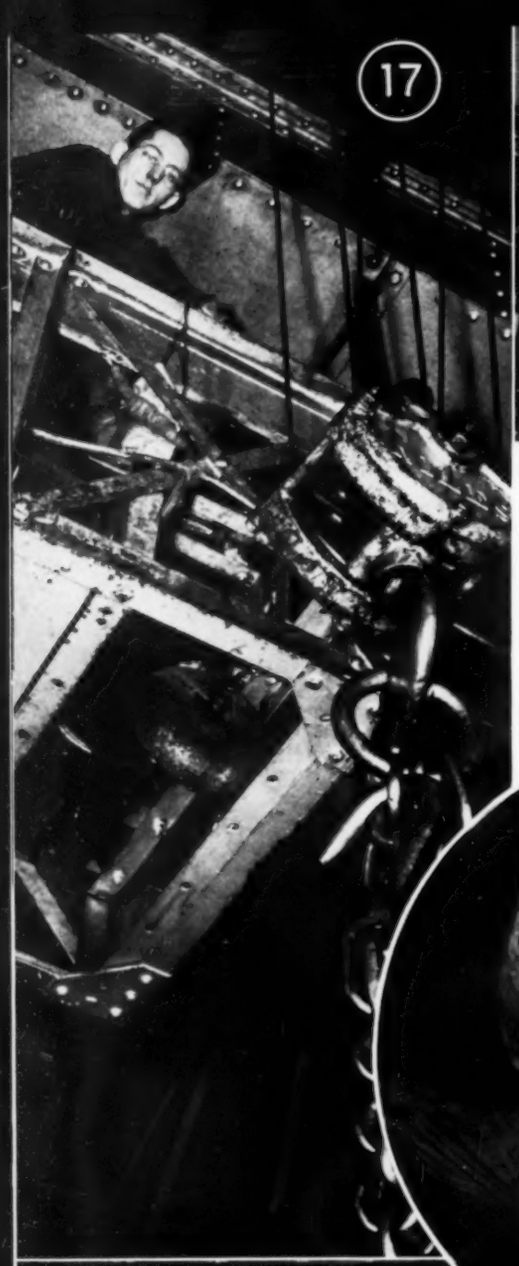
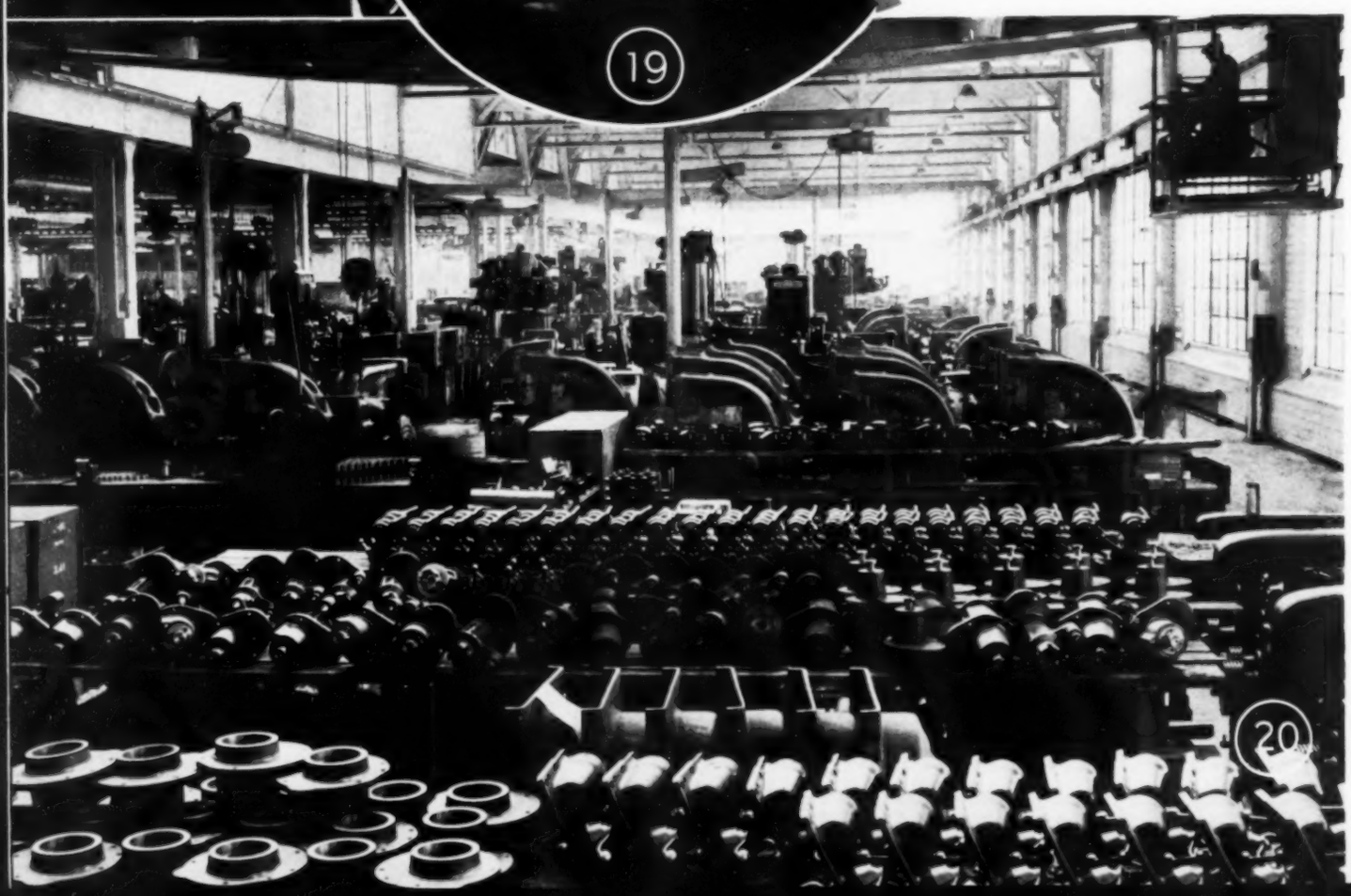


Fig. 17—Boss of the cat-walk, the crane operator peers down high above the working floor watching for a sign for a lift. Fig. 18—Railroad crane operator and his helper use a large electric magnet to stack, sort and deliver scrap iron and steel to the overhead yard crane in the foundry. Fig. 19—Not everybody eats in the firm's restaurants. Those big, slablike 'Dagwood' sandwiches taste just as good with an upturned blacking bucket for a chair and a bottom board for a table. Fig. 20—A view of the manufacturing area of a large machine tool plant. Finished parts and sub-assemblies in the foreground give some idea of the complexity of machine tools. One average milling machine contains 2000 separate parts



A.S.T.M. Considers War Emergency Specifications

WITH the present war essentially one of materials, it is not surprising that major attention of members and guests attending the forty-fifth annual meeting of the American Society for Testing Materials was devoted to war emergency problems. The meeting was held at Chalfonte-Haddon Hall in Atlantic City, N. J., from June 22 to 26. As C. L. Warwick, secretary-treasurer, pointed out in his annual report, there hardly has been any field of materials which has not been affected markedly by the war—with the greatest effect in the ferrous and nonferrous fields. Many of the research committees of the society are engaged on projects to develop authoritative information on materials entering into ordnance or products essential in the war effort.

Large increases in quotas from various industries and the need for conservation of critical or strategic materials has influenced standardization activities to a great extent, as indicated by the recent issuance by A.S.T.M. of some 50 emergency alternate provisions of existing standards. Of those 15 apply to the castings field, and are reported on page 97 of this issue of THE FOUNDRY.

New officers elected for the ensuing 1942-1943 term are H. J. Ball, Lowell Textile Institute, Lowell, Mass., president and P. H. Bates, National Bureau of Standards, Washington vice president. Mr. Bates term will be 2 years. New members of the executive committee elected include R .P. Anderson, American Petroleum Institute, New York; Maurice H. Bigelow, Plaskon Co. Inc., Toledo, O.; J. H. Foote, Commonwealth & Southern Corp., Jackson, Mich.; Alexander Foster Jr., Warner Co., Philadelphia, and Lawford H. Fry, Edgewater Steel Co., Pittsburgh.

H. J. Ball
President

Discuss Importance of Industrial Radiography

Importance of radiography as a tool for testing materials was exemplified by a symposium on the subject which occupied three sessions on Tuesday, and covered various phases of procedure and application of radiographic methods. Some 14 papers including the report of committee E-7 on radiographic testing were presented at the several sessions. Don M. McCutcheon, Ford Motor Co., Dearborn, Mich., spoke on, "Some Aspects of X-ray Inspection Applied to Testing and Production" in which he pointed out that while his firm had been using x-ray examination since 1930 in the development of production castings, war requirements in aircraft and other castings have necessitated the extension of such examination to all or part of the total production. In addition, there has been a large expansion in use of the x-ray for foundry development purposes.

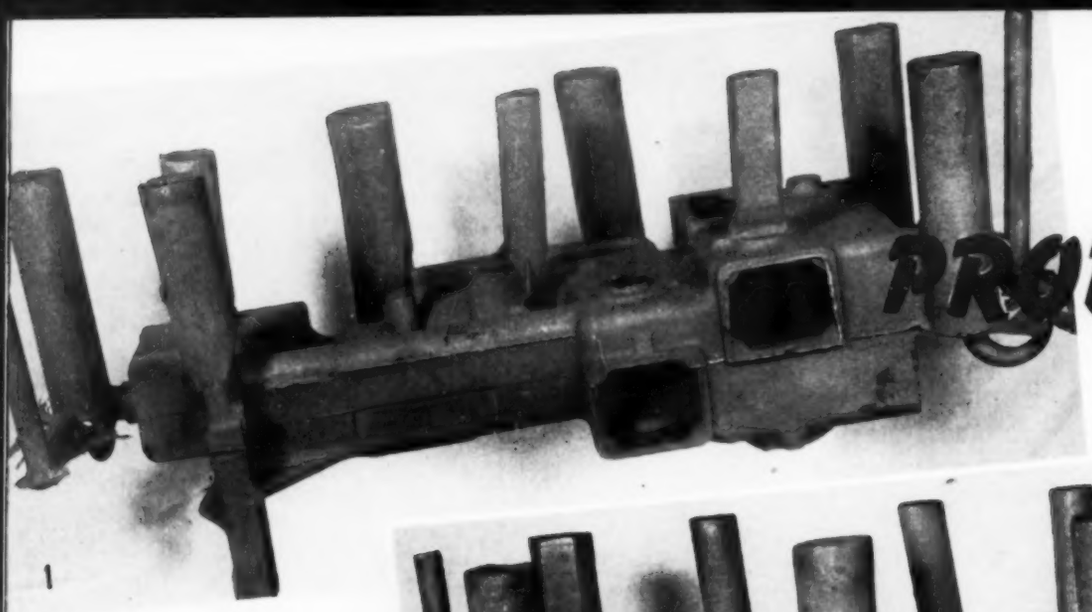
Due to the wide variety of metals and section sizes which are examined, it has been advisable to have a number of x-ray units to provide maximum efficiency in examination. Applied voltages of the units range from 5000 to one million volts. The low voltage unit is used for microradiography and x-ray examination of welds in thin aluminum sheet while the more powerful units are used for examination of heavier castings.

L. W. Ball, National Research Council, Ottawa, Canada, discussed "Some Calibration Data and Scatter Measurements for the Radiography of Magnesium Aircraft Castings," in which he pointed out that by proper co-ordination of applied voltage, type of film used, section thickness and shape of the magnesium casting to be examined, results could be obtained as good as those secured for aluminum castings. He presented numerous curves showing sensitivity under different conditions to illustrate his remarks.

"Correlation of the Mechanical Properties and Radiographic Appearance of Magnesium Alloy Castings," was the title of a paper presented by R. S. Busk, Dow Chemical Co., Midland, Mich., in which he described a procedure for quantitatively rating radiographs showing porosity in magnesium base alloys. That was accomplished by varying the intensity of the viewing light and noting the voltage at which the porosity was just visible. The reciprocal of the voltage multiplied by 10,000 was used as the scale, and was termed the contrast index. The scale then was used to study the effect of microporosity on the tensile properties of two magnesium alloys in the as-cast, and other states.

Data obtained by the author indicated that the tensile strength of magnesium alloys decreases as microporosity increases, and that the yield strength is little affected. The alloys are more sensitive to porosity in the solution heat treated state than in the as-cast. An alloy containing 9 per cent aluminum, 2 per cent zinc, 0.1 per cent manganese, and remainder (*Please turn to page* 142)

PRODUCING



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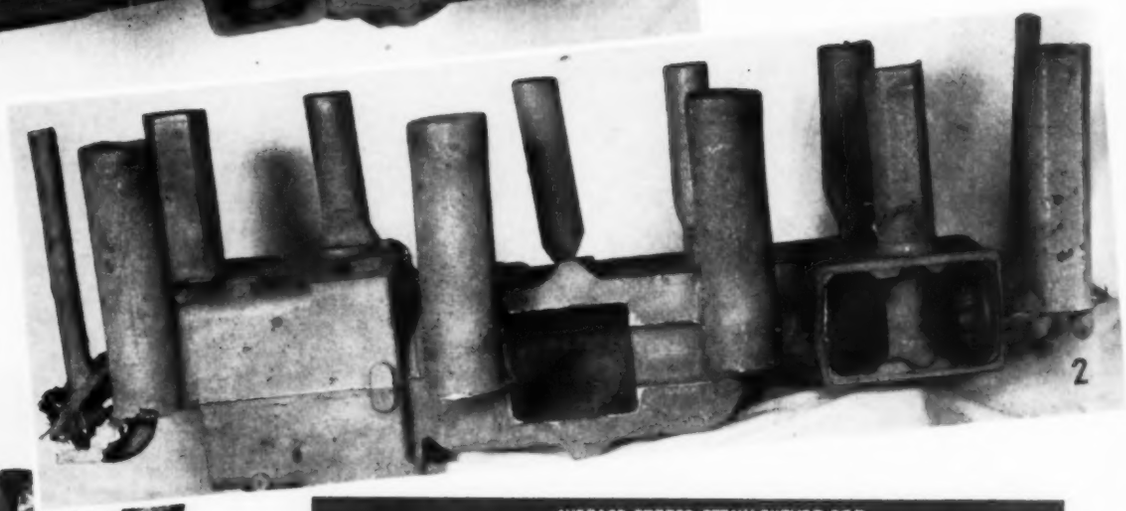

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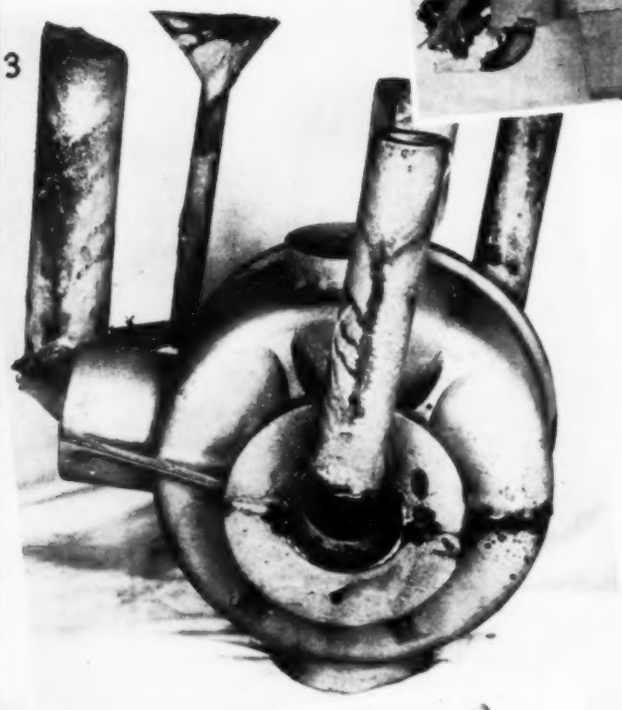

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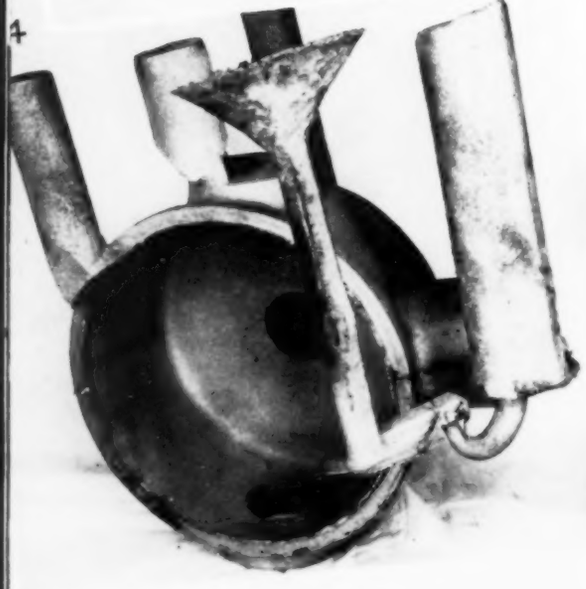

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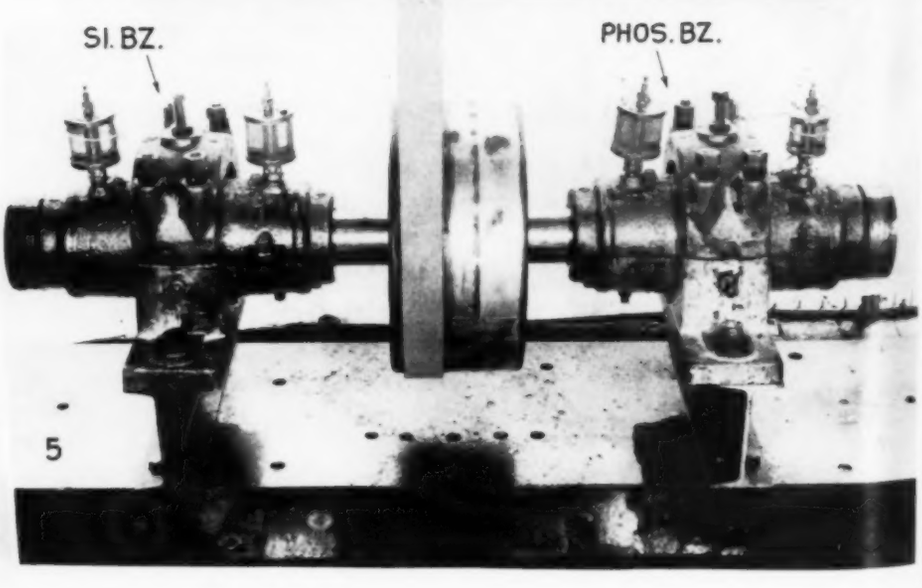

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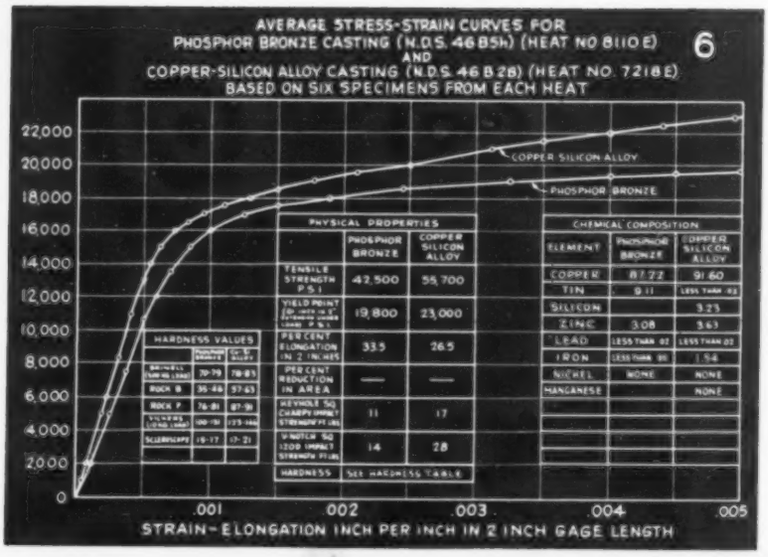

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SILICON BRONZE CASTINGS

By J. E. CROWN
Master Mechanic
U. S. Naval Gun Factory
Washington

SILICON bronze is an alloy of copper and silicon with iron, manganese, zinc, lead, aluminum and nickel as additional alloying elements. We conducted some experiments back in 1929 but not until about a year ago was it taken up for general production work and since then, we have melted about half million pounds.

In the copper-silicon and copper silicon iron group, 4 per cent zinc is added in one of the standard mixes which acts as a deoxidizer to prevent porosity and at the same time improves machinability. Normally, tensile strength of 45,000 to 50,000 pounds per square inch and an elongation of 15 to 35 per cent is obtained readily. This may be increased by varying the composition. Addition of ½ to 1 per cent lead will improve machining qualities greatly, but will reduce the physical properties.

Silicon bronze may be melted in any conventional brass furnace, but our experience has been exclusively with natural draft or forced draft crucible furnaces. We have used ready mixed ingots, but the greater percentage of output has been made from 80 per cent copper, 16 per cent silicon hardener and 4 per cent zinc. The commercial hardener has a composition of 70 per cent copper, 22 per cent silicon, 8 per cent iron. The final composition of the alloy is about 3.25 per cent silicon, 4.0 per cent zinc, 1.25 per cent iron, 91.5 per cent copper, and gives a normal average tensile strength of 50,000 pounds per square inch and an elongation of 25 per cent.

In making this alloy, all copper is melted down and the hardener then added. Sufficient time is allowed for the hardener to dissolve in the copper. The metal is stirred thoroughly and the zinc then is added. No flux or covering is used and practically no porosity is experienced.

Glass Used for Covering

Use of glass as a covering, which is charged with the copper, is common practice in many plants. Some use 2 to 3 ounces of calcium boride as a flux. Heads, gates and scrap may be remelted in any proportion up to 100 per cent with little or no reduction in the physical properties obtainable.

Silicon bronze runs easily and a pouring temperature of 1900 to 2100 degrees Fahr. has been found most satisfactory.

Choking the gate while pouring is essential and strainer gates or inverted horn gates have proven very successful. Silicon bronze has a narrow cooling range, therefore, slightly larger risers are necessary.

Silicon bronze is easy on a mold, being similar in that respect to manganese bronze. It may be cast in green sand, skin dried (*Please turn to page* 141)

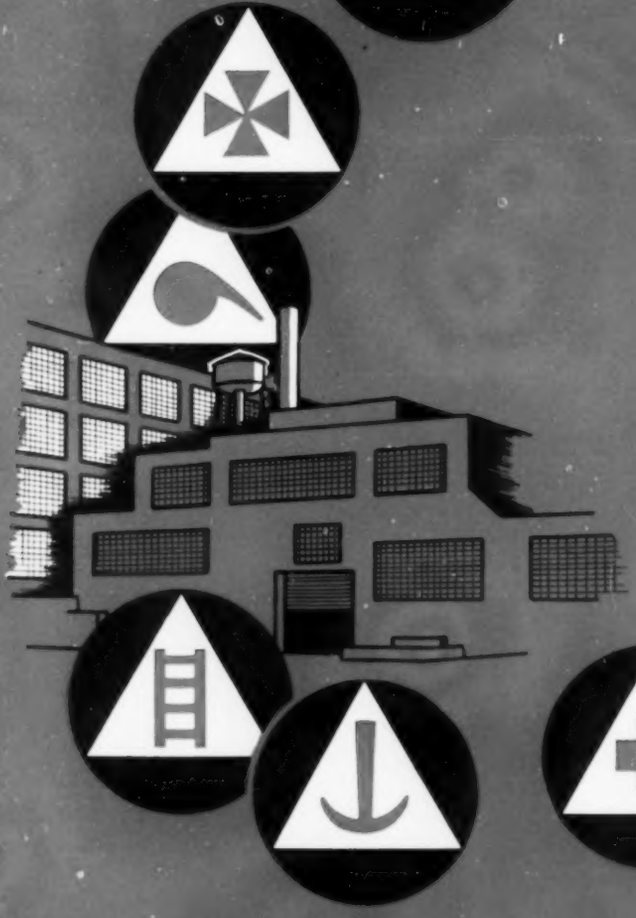
COMPARATOR CHART

RUNNING TEST 210 R.P.M.
LUBRICATION #2110 OIL 10 DROPS PER MIN.

SILICON BRONZE BEARING No. 3745				SHAFT No. 1 (RUNNING WITH BEARING NO. 3745)				SHAFT No. 1 (RUNNING WITH BEARING NO. 3748)				NAVY PHOS. BRONZE BEARING No. 3748			
BEFORE RUNNING		AFTER RUNNING		BEFORE RUNNING		AFTER RUNNING		BEFORE RUNNING		AFTER RUNNING		BEFORE RUNNING		AFTER RUNNING	
A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
.28943	.28946	.28943	.28946	.28920	.28918	.28918	.28914	.28920	.28919	.28918	.28918	.28932	.28932	.28934	.28934
.28933	.28932	.28933	.28932	.28921	.28919	.28920	.28914	.28918	.28918	.28916	.28916	.28934	.28935	.28938	.28935
.28933	.28935	.28933	.28935	.28921	.28918	.28920	.289145	.28916	.28916	.289145	.28915	.28934	.28934	.28934	.28934
.28934	.28933	.28934	.28933	.28921	.28918	.28920	.289155	.28915	.28916	.289135	.28914	.28932	.28933	.28937	.28937
.28937	.28936	.28947	.28936	.28921	.28918	.28921	.28916	.28913	.28916	.28912	.28913	.28934	.28937	.28935	.28937
.28944	.28940	.28944	.28941	.28922	.28918	.28921	.28916	.28912	.28914	.289125	.289125	.28934	.28944	.28941	.28944
.28931	.28935	.28935	.28935	.28922	.28919	.28921	.28916	.28912	.28914	.289115	.289120	.28938	.28930	.28943	.28933
.28934	.28940	.28934	.28940	.28922	.28918	.28921	.28916	.28912	.28914	.289115	.289115	.28936	.28935	.28943	.28942
.28933	.28935	.289375	.28935	.28921	.28918	.28921	.289145	.28911	.28913	.289110	.289110	.28944	.28946	.289445	.289465
.28934	.28939	.28934	.28939	.28922	.28917	.28922	.28915	.28911	.28913	.289110	.289110	.28934	.28940	.289345	.289405
.28950	.28944	.28950	.28944	.28921	.28915	.28921	.28915	.28911	.28913	.289110	.289110	.28952	.28957	.28960	.28963
3.8306	3.8315	3.83245	3.83216	3.81834	3.81096	3.81826	3.80665	3.81051	3.81065	3.80425	3.81045	3.81304	3.81923	3.81844	3.81846
.289369	.289377	.2893859	.289378	.2892127	.2891780	.2892054	.2891530	.2891370	.289150	.2891290	.2891318	.2893677	.2893845	.2894036	.2894054
WEAR →		.000167	.00001			.000073	.000267			.00008	.000182		WEAR→	.000364	.000209
AVERAGE TEMPERATURE DEGREES FAHRENHEIT												AVERAGE TEMPERATURE DEGREES FAHRENHEIT			
LOW 78° HIGH 93° AVERAGE - 85½°				195 RUNNING HOURS								LOW 82° HIGH 97° AVERAGE - 89½°			

Fig. 1—Bracket made from silicon bronze alloy. Fig. 2—View of same casting from opposite side. Fig. 3—Housing made from silicon bronze. Fig. 4—Same casting viewed from opposite side. Fig. 5—Set up for wear testing of two types of bronze. Fig. 6—Stress-strain curves for phosphor bronze and for silicon bronze. Fig. 7 (Left) — Comparator chart

PROTECTING LIFE, PROPERTY, AND PRODUCTION



Code of Recommended Practices Developed by the Industrial Hygiene Codes Committee of the American Foundrymen's Association Reviewed and Passed by the Office of Civilian Defense

In the Foundry Industry During the War—Part IV

SECTION IX—PROTECTION REQUIRED FOR BLACKOUTS AND BOMB RAIDS (CONTINUED)

(L)—*Exterior Lighting.* During a blackout period, all exterior lights on the plant property should be extinguished. Whenever possible it is well to control the exterior lighting circuits from some centralized point. In any event, it should be an assigned duty to turn off all lights. If emergency lights are needed out of doors they should be installed according to lighting recommendations of the Office of Civilian Defense.

Use of outdoor emergency lights should be restricted and they should be used sparingly at gates, entrances, strategic areas and the like. It should be kept in mind that even a minimum of emergency light shining on black or dark surfaces is more noticeable from above than if the surfaces are of a light color. Extra effort should be made to eliminate any possibility of light reflection out of doors as from pools of water forming after a rain and the like.

(M)—*Outside Signal Lights.* If any signal lights within the plant belong to the plant or are under the control of the plant, such as railroad, bridge, dock, barge and traffic signals, and they cannot be extinguished, a shield should be provided over the top of the light and such shield should extend out beyond the light so that the light cannot be seen at an angle any higher than is intended.

If such signal lights are under the jurisdiction of

railroads or municipalities, or controlled by navigation rules, the proper authority should be approached to obtain their cooperation.

(N)—*Other Outside Lights.* During a blackout all locomotives, trucks, automobiles and other conveyances, which must continue operation, should be equipped with devices recommended by the Office of Civilian Defense or be required to turn off all lights while on company property.

(O)—*Other Means of Lighting and Distinguishing Objects.* There are various methods that can be employed to indicate the aisles and gangways in buildings and/or to denote pavements and roadways. Obstacles can be treated to show up in the dark, and even equipment can be treated in such a manner that it is possible to operate it within certain limitations. Any of the following methods may be used, depending upon the various factors involved and none of the light given off by the surfaces so treated would be visible at any low altitude that planes might travel in.

(1) *Luminous Paint.* Luminous paint which gives off a phosphorous glow can be used for markings and special warnings, but the material is quite expensive and has the drawback that it must be energized every few hours during the night with a light source, to be effective.

(2) *Reflecting Marker Material*—Roadway traffic lanes, aisle and gangway boundaries, posts and obstacles may be painted with a special pigmented binder material and the surface of this coating covered with clear, transparent glass spheres. Surfaces so marked will show up and define the boundaries and objects with a minimum of light, such as from a dulled flashlight and motor car or truck emergency headlights.

(3) *Black Light.*

(a) *Method.* Black light is a system of painting surfaces and objects with a luminescent or fluorescent coating and energizing such coating with invisible rays of a wave length commonly used in fluorescent lighting with either alternating or direct current.

(b) *Limitations.* Visibility of black light is dependent on the energy excitation which ranges from 0.25 watts to several hundred watts, depending on the distance and area to be irradiated. Maximum effective distance for the larger wattage output is approximately 50 feet. For lower wattages the effective distance is reduced greatly.

(c) *Application.* Surfaces to be coated must be cleaned thoroughly in a manner similar to the preparation for any good paint job. Method of application of coatings is as recommended by manufacturers. The coating may be applied indoors or outdoors. Coatings containing fluorescing material made of natural earth sources hold their fluorescent efficiency indefinitely and their life is governed by the quality of the vehicle used in them.

Coatings containing fluorescing material made of a synthesis of earthen material or which are of inorganic construction, have a fluorescent life of from 6 to 12 months.

Coatings containing fluorescing material made of organic sources such as coal tar derivatives, have a very much shorter fluorescent life of about 2 to 3 months, but are more efficient when newly applied than the other two types. Cost of the coating is largely predicated on the cost and grade of the vehicles used, and prices approximate regular paint cost. Coverage obtained from fluorescent coatings depends on the condition of the surface and follows the coverages ordinarily obtained with regular paints.

(d) *Use of Colors.* Fluorescent colors commonly available are the primary colors, and all other colors resulting from (*Please turn to page* 132)

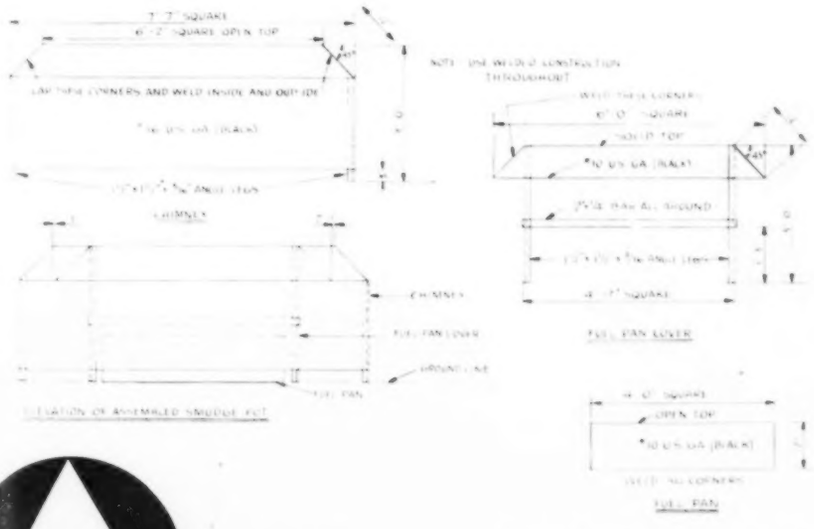
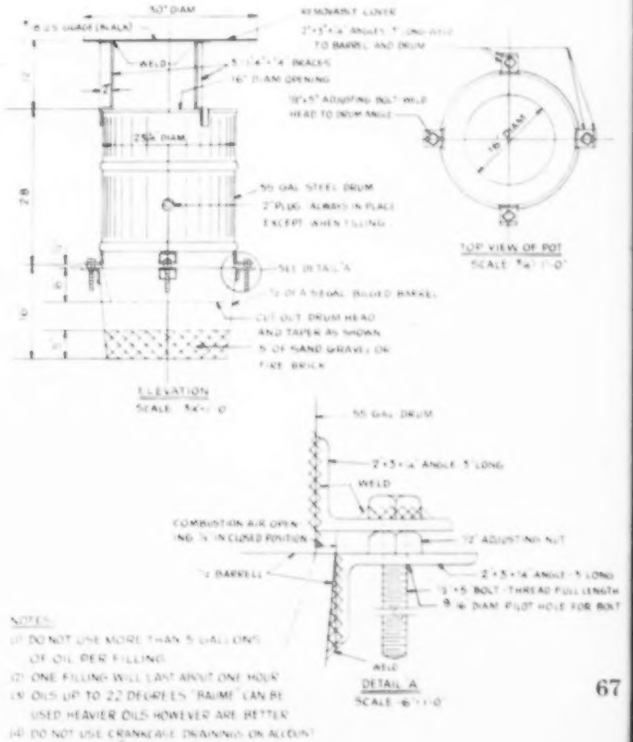
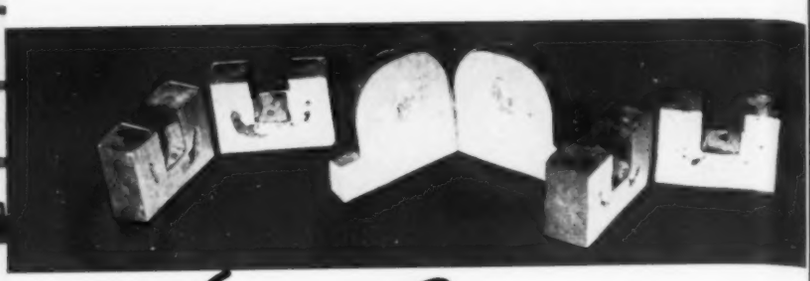


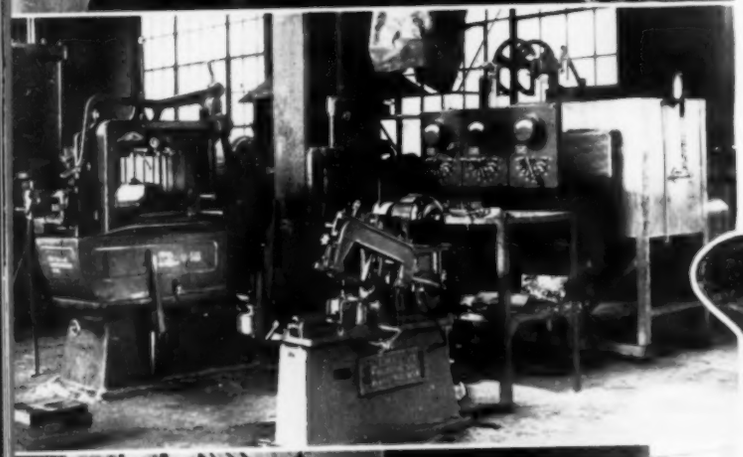
Fig. 6 (Above)—Large smudge pot for protective smoke screen. Fig. 7 (Right)—Typical small smudge pot

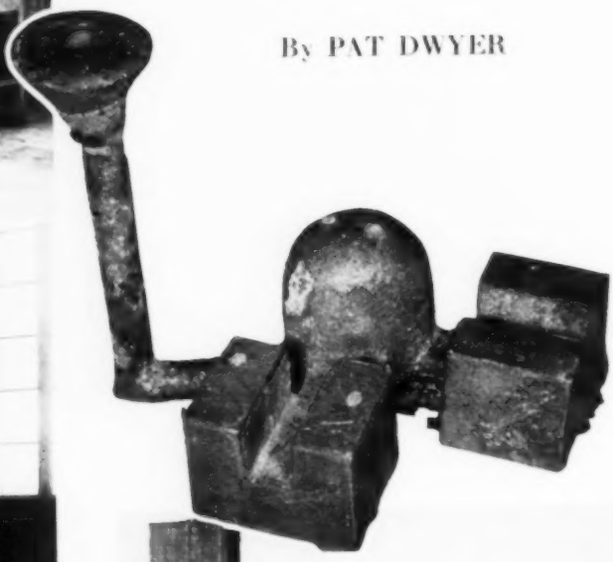


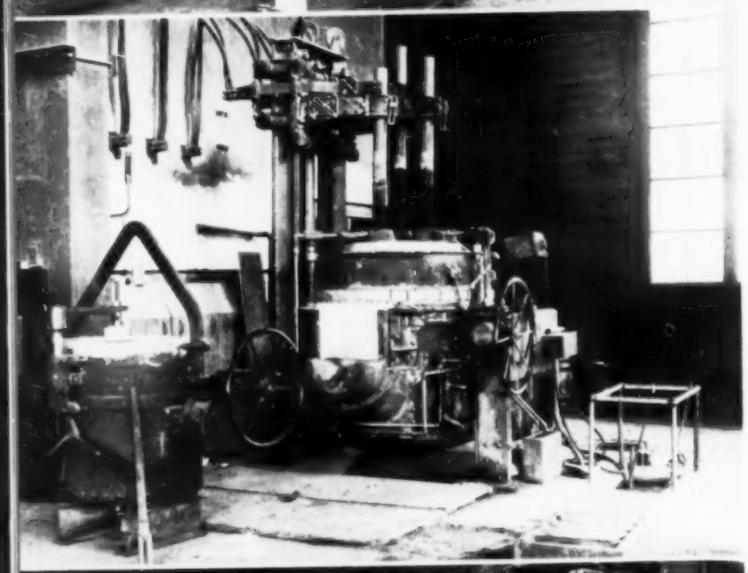


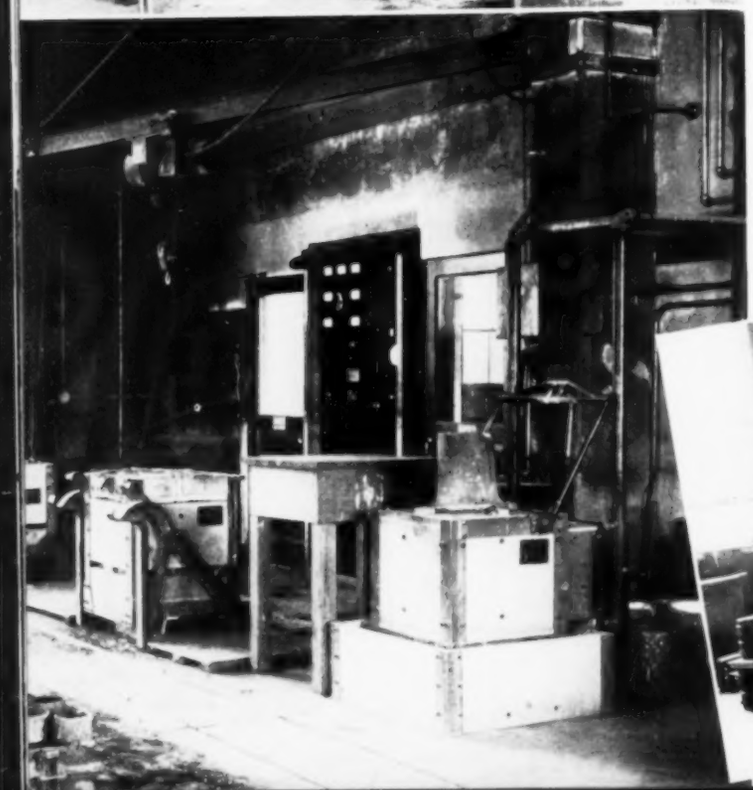
Navy Carries on

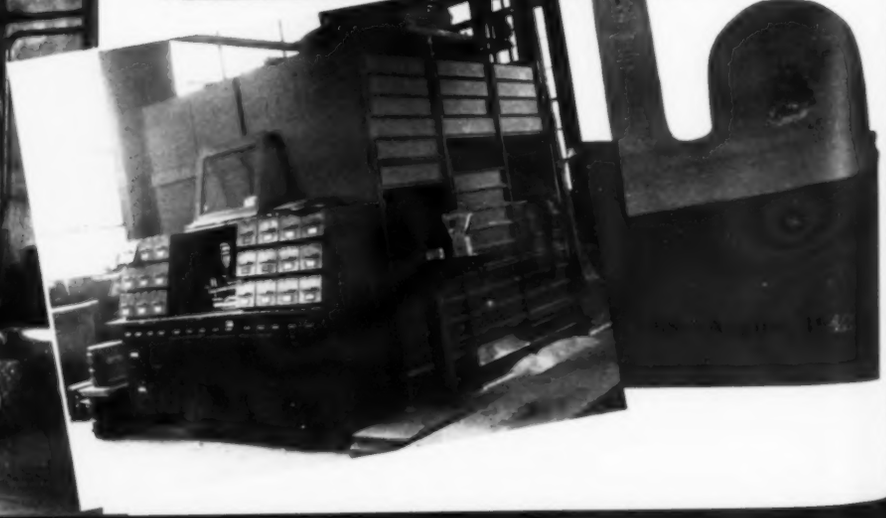
By PAT DWYER

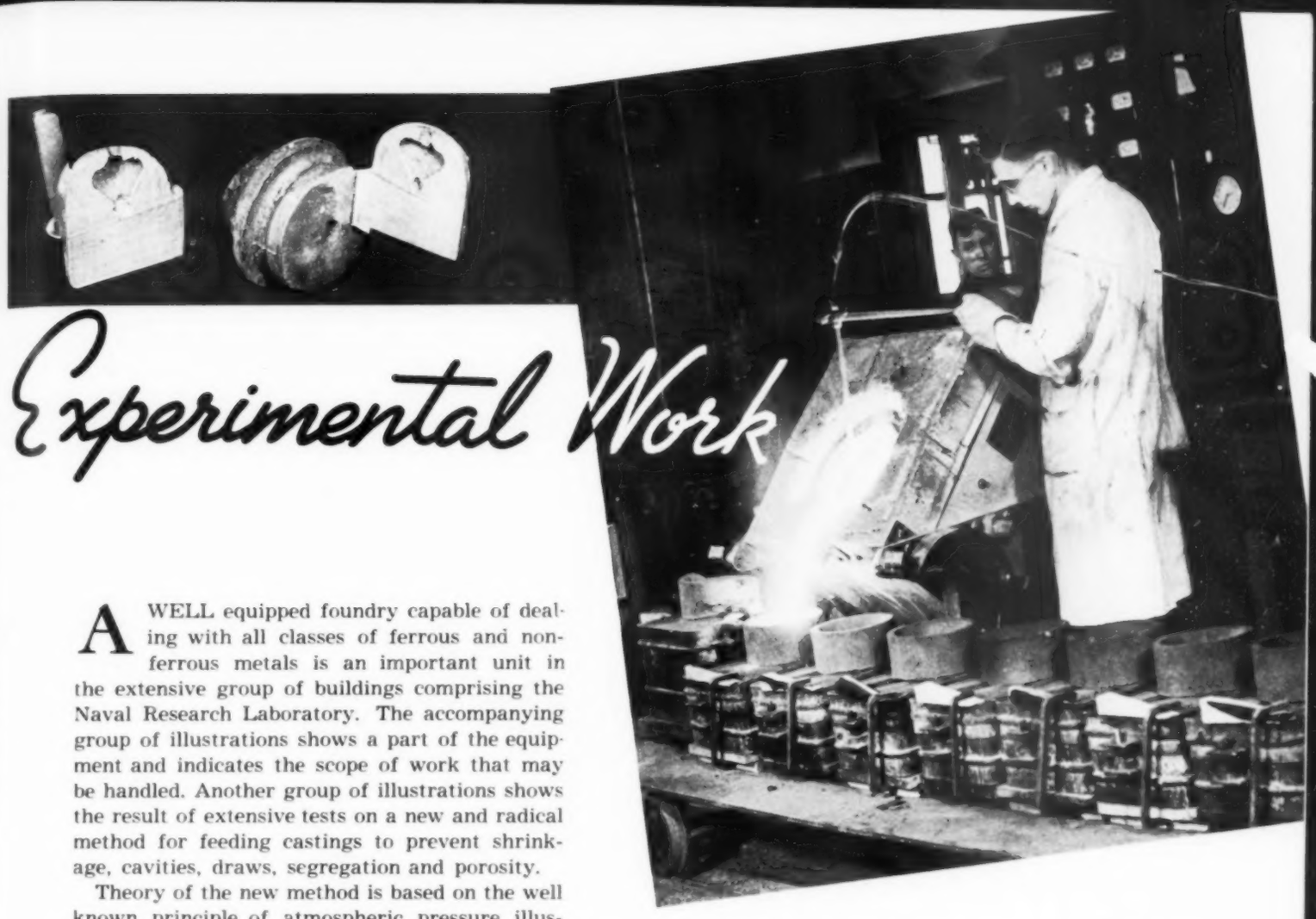












Experimental Work

A WELL equipped foundry capable of dealing with all classes of ferrous and nonferrous metals is an important unit in the extensive group of buildings comprising the Naval Research Laboratory. The accompanying group of illustrations shows a part of the equipment and indicates the scope of work that may be handled. Another group of illustrations shows the result of extensive tests on a new and radical method for feeding castings to prevent shrinkage, cavities, draws, segregation and porosity.

Theory of the new method is based on the well known principle of atmospheric pressure illustrated by the familiar saying that water or for that matter, any other liquid always seeks its own level. Familiar examples are the barometer in which the column of mercury is held at an approximate height of 30 inches and varies in height with the density of the atmosphere, and the water gage on a boiler in which the height of water in the gage corresponds to the water level in the boiler.

A comprehensive paper on the subject was presented by H. F. Taylor and E. A. Rominski at the Chicago meeting of the Steel Founders' Society of America in January and another paper by the same authors was presented at the American Foundrymen's Association convention in Cleveland April 20-24. Although intrinsically simple, the theory and application of the method presents so many ramifications that a study of these papers is essential to a proper understanding of the subject.

Molten metal is liquid and while in that state is subject to the universal laws of pressure and gravity. However in passing from the liquid to the solid state solidification begins on the outside of the casting in contact with the wall of the mold and progresses toward the center. With the frozen shell steadily growing thicker and with gravity pulling the liquid metal downward as well as toward the center the casting eventually will develop a void in the center unless a method is adopted to supply additional liquid metal from an outside source. In some instances this metal is supplied by the (*Please turn to page* 139)

Fig. 1 (Top extreme left)—Display in laboratory office includes many experimental castings. Fig. 2 (Upper center extreme left)—High temperature furnace in background and saws in foreground. Fig. 3 (Lower center extreme left)—Electric arc furnace. Fig. 4 (Lower extreme left)—Induction furnaces for steel, gray iron and nonferrous melting. Fig. 5 (Left above)—What happens when blind riser is not kept open. Fig. 6 (Upper center left)—What occurs when blind riser is kept open. Fig. 7 (Lower center left)—Blind head feeding a test flange with head kept open. Fig. 8 (Left below)—Storage bins for materials. Fig. 9 (Left)—Blind head not kept open. Fig. 10 (Above left)—Blind head used on pulley casting. Fig. 11 (Below left)—How the castings were made. Fig. 12 (Above right)—Pouring fluidity molds. Fig. 13 (Below right)—Mold used in testing chaplets.

Light Alloy Castings in Aircraft

NONFERROUS casting alloys for the aircraft industry may be classified into four types; namely, aluminum, magnesium, copper and zinc alloys. Greatest demand is for aluminum and magnesium alloys, due to their low densities. Least demand is for zinc casting alloys, although use of zinc is increasing rapidly as a substitute for aluminum and magnesium wherever the higher density of the zinc alloys is not of major importance. Copper castings are used to a limited extent, owing to the high density of copper alloys, although the strength and corrosion resistance of copper alloys are very much desired.

Casting alloys may be classed in four groups as follows: 1. Sand; 2. Permanent and semipermanent mold; 3. Die; 4. Plaster mold. All but the die casting group of alloys may be further subdivided into non-heat-treatable and heat-treatable alloys. In the former group, improvement in properties is accomplished by alloying alone, and in the latter, heat treatment processes are used to enhance further the mechanical properties.

Type of casting process which is used will depend upon several factors. For large and for intricate cored castings, use of sand molds is necessary. Because metal mold or steel die is required, use of die and permanent mold castings can be considered only where a sufficiently large number of castings of the same pattern will be used to justify the cost of the mold or die. The die casting process is particularly adapted to the quantity production of relatively small castings in which close dimensional tolerances are required and the cost of finishing must be held to a minimum.

The dimensional tolerances of permanent mold castings are intermediate between those of sand castings and those of die castings, and the surface finish approaches that of die castings. Plaster mold castings

Table I

Composition, Properities and Commercial Equivalents Of Aluminum Sand Casting Alloys

Composition (Typical)

Alloy Designation	Copper	Silicon	Iron	Magnesium	Nickel	Aluminum
43	...	5.0	...	...	...	Remainder
47	...	12.5	...	...	...	Remainder
122	10.0	...	1.2	0.2	...	Remainder
142	4.0	...	...	1.5	2	Remainder
195	4.0	...	...	...	...	Remainder
214	...	...	...	3.8	...	Remainder
220	...	...	...	10.0	...	Remainder
355	1.3	5.0	...	0.5	...	Remainder
356	...	7.0	...	0.3	...	Remainder

Properties (Typical)*

Alloy Designation	Tensile Strength lb. per sq. in.	Yield Strength lb. per sq. in.	Elongation per cent	Compressive Yield lb. per sq. in.	Shear Strength lb. per sq. in.	Fatigue Strength lb. per sq. in.	Brinell Hardness
43	19000	9000	6.0	10000	14000	6500	40
47	26000	11000	8.0	11000	18000	6000	50
122-T2	25000	20000	1.0	20000	21000	9500	75
122-T61	36000	30000	1.0	43000	29000		100
142-T2	27000	18000	1.0	18000	21000	6500	75
142-T61	37000	32000	0.5	47000	32000	8000	100
195-T4	31000	16000	8.5	16000	24000	6000	65
195-T6	36000	22000	5.0	25000	30000	6500	80
214	25000	12000	9.0	12000	20000	3500	50
220-T4	45000	25000	14.0	26000	33000	7000	75
355-T4	30000	20000	4.0	25000	30000		60
355-T6	35000	25000	3.5	29000	30000	8500	80
356-T4	28000	16000	6.0	18000	22000		55
356-T6	32000	22000	4.0	22000	27000	8000	70

Commercial Equivalents

Alloy No.	S.A.E.	Army	Navy	Federal	Aircraft Materials Specifications
43	35	11311	46 Ale Cl .2	QQ-A-601 Cl. 2	
47	37				
122	34		M 212a Cl. 6	QQ-A-601 Cl. 7	
142	39	57-71-1cA	M 212a Cl. 5	QQ-A-601 Cl. 6	
195	38	57-72-5B	46 Ale Cl. 4	QQ-A-601 Cl. 4	
214	320	57-72-4A	46 Ale Cl. 5	QQ-A-601 Cl. 5	
220	321	11309-A	M-186c		
355	322	11307-A	M-212a Cl. 10	QQ-A-601 Cl. 10	4210 A
356	323	11308-A	46 Ale Cl. 3	QQ-A-601 Cl. 3	4212 A 4214

*Note: Data taken from materials suppliers records. Heat treatment designations: T2—Annealing Treatment; T4—solution treatment; T6—solution treatment plus aging; and T61—solution treatment plus aging.

Table II

Composition, Properties and Commercial Equivalents Of Permanent Mold Aluminum Alloys

Composition (Typical) per cent

Alloy Designation	Copper	Silicon	Iron	Magnesium	Nickel	Aluminum
43	...	5.0	...	...	...	Remainder
A108	4.5	5.5	...	...	...	Remainder
122	10.0	...	1.2	0.2	...	Remainder
A132	0.8	12.0	0.8	1.0	2.5	Remainder
142	4.0	...	...	1.5	2.0	Remainder
B195	4.5	2.8	...	...	...	Remainder
355	1.2	5.0	...	0.5	...	Remainder

Properties (Typical)*

Alloy Designation	lb. per sq. in. Tensile Strength.	per cent Elongation.	Hardness Brinnell
43	21,000	2.5	40
A108	24,000	0.5	70
122-T52	30,000	0.0	105
122-T65	40,000	0.0	140
A132-T4	34,000	1.0	100
A132-T551	31,000	0.0	105
142-T61	40,000	0.0	110
142-T571	34,000	0.0	105
P195-T4	33,000	4.5	75
B195-T6	35,000	2.0	90
355-T6	37,000	1.5	95

Commercial Equivalents

Alloy Designation	S.A.E.	Army	Navy	Federal
43	35	.....	46-A-15 Cl. 7	QQ-A-596 Cl.7
A-108		.....	46-A-15 Cl. 5	QQ-A-596 Cl.5
122	34	.....	46-A-15 Cl. 2	QQ-A-596 Cl.2
A132	321	.....	46-A-15	QQ-A-596
142	39	.....	46-A-15	QQ-A-596
B195		.....	46-A-15	QQ-A-596
355	322	.....	46-A-15	QQ-A-596

*Note: Data taken from publications of materials producers.

are similar to sand castings but with smoother surfaces and closer tolerances.

Many of the sand cast alloys can be cast successfully in permanent molds, but in other cases, special alloys have been developed for that purpose. Permanent mold castings have the advantage over sand castings in greater ultimate strength but lower ductility, more exact size and better surface. Permanent mold castings are used where a superior product is required, or when a forging cannot be used, either because of the form of the part or because of cost considerations. Strength of a casting produced from a given alloy in a permanent mold is about 10 per cent greater than that obtained from a sand casting. Dimensions may be controlled more accurately than in a sand mold casting, and either a machined or polished surface generally will show greater freedom from porosity. In addition to superior mechanical properties, permanent mold castings also have greater resistance to corrosion and greater susceptibility to heat treatment, due to the fine grain and greater density of the metal.

The die casting process is adapted to the production of castings in which extreme accuracy, uniformity, and superior finish are essential. In this process, very thin walls may be cast with a consequent saving of weight in the finished product. Holes may be cast to close tolerances and the dimensions can be controlled so closely that they reduce machining operations to a minimum. Die cost is high so that this process is suitable only for castings which are produced in large quantities. The great advantage of the die casting process is that it makes possible rapid production of castings which are substantially exact duplicates of each other. Pressure and chilling action in die casting result in fine grain castings. However, due to the rapid chilling, much air can be entrapped with subsequent porosity. All die castings, are, therefore, subject to internal porosity and consequently do not possess high impact strength and ductility. New high-pressure die casting methods produce sounder and denser die castings.

Plaster mold castings are obtained from molds made by pouring a liquid mixture of gypsum (calcium sulphate), water and suitable binder, such as asbestos, into a flask containing the metal pattern. The molds are allowed to set and (*Please turn to page* 146)

Table III

Composition, Properties and Commercial Equivalents Of Aluminum Die Casting Alloys

Composition (Typical) per cent

Alloy Designation	Copper	Silicon	Magnesium	Aluminum
13		12		Remainder
43		5		Remainder
85	4	5		Remainder
218			8	Remainder

Properties (Typical)

Alloy Designation	Tensile Strength, lb. per sq. in.	Yield Strength, lb. per sq. in.	Elongation, per cent	Brinell Hardness	Charpy Impact, ft. lb.	Endurance Limit, lb. per sq. in.
13	33,000	18,000	1.8	80	2.0	15,000
43	29,000	13,000	3.5	65	4.5	...
85	35,000	19,000	2.7	70	2.5	17,000
218	36,000	23,000	5.0	...	10.0	17,000

Commercial Equivalents

Alloy Designation	S.A.E.	Army	Navy	Federal
13	305	59-93-1B Gr. 2	46 A-14 Cl. 1 and 2	QQ-A-591 Cl. 1 and 2
43	304	57-93-1B	46 A-14 Cl. 3 and 8	QQ-A-591 Cl. 3 and 8
85	307	57-93-1B Gr. 1	46 A-14 Cl. 5	QQ-A-591 Cl. 5
218	...	...	46 A-14 Cl. 7	QQ-A-591 Cl. 7

Table IV

Classification of Magnesium Alloys According to Characteristics

Heat-Treatable Alloys

Alloy Designation	Casting Process	Composition, per cent (Typical) Aluminum	Manganese	Zinc	Silicon	Magnesium	Characteristics
G AM-240	Sand and Permanent Mold	10.0	0.10	...	...	Remainder	Moderate tensile strength and leak-proofness.
AM-241	Sand and Permanent Mold	8.0	0.10	...	...	Remainder	High impact strength and high ductility.
B AM-246	Sand	12.0	0.10	...	...	Remainder	High hardness, high yield strength and low elongation.
C AM-260	Sand	9.0	0.10	...	..	Remainder	Soundness and leak-proofness and requiring high strength —Pressure tight castings.
H AM-265	Sand and Permanent Mold	6.0	0.20	3.0	...	Remainder	High physical properties and fine grain.

Non-heat-Treatable Alloys

M AM-403	Sand	..	1.2-2.0	...	0.3 Max.	Remainder	Good stability and welding characteristics.
K AM-230	Die	10.0	0.10	0.5	...	Remainder	Thin walled die castings of moderate strength.
R AM-263	Die	9.0	0.20	0.6	...	Remainder	Good strength die castings (general).

Table V

Typical Physical Properties of Magnesium Alloys

Alloy Designation →	AM-240 and G H.T.*	AM-240 and G H.T.A.**	AM-241 H.T.	AM-246 and B. H.T.A.	AM-260 and C. H.T.	AM-260 and C. H.T.A.
Tensile Strength, pounds per square inch	33,000	34,000	33,000	32,000	38,000	38,000
Yield Strength, pounds per square inch	12,000	19,000	11,000	20,000	14,000	20,000
Elongation, per cent	8	1.0	10.0	0.5	10	3.0
Shear Strength, pounds per square inch	20,000	22,000	18,000	19,000	20,000	22,000
Charpy Impact, foot pounds	..	0.7	2.2	0.5	..	0.8
Brinell	52	69	48	85	61	78
Endurance Limit, pounds per square inch	10,000	8,000	7,500	7,000	10,000	10,000

Alloy Designation →	AM-265 and H H.T.	AM-265 and H H.T.A.	AM-230 and K, As-Cast	AM-263 and R, As-Cast	AM-403 and M, As-Cast
Tensile Strength, pounds per square inch	37,000	37,000	30,000	33,000	14,000
Yield Strength, pounds per square inch	10,000	9,000	...	...	...
Endurance Limit, pounds per square inch	12,000	18,000	22,000	20,000	4,000
Shear Strength, pounds per square inch	18,000	19,000	...	...	11,000
Elongation, per cent	10.0	4.0	1.0	3.0	5.0
Charpy Impact, foot pounds	2.5	1.1	...	...	...
Brinell	53	69	68	66	33

Commercial Equivalents

Alloy	A.M.	A.M.S.	Navy	Army	S.A.E.
G	...	4434	M112 Alloy 17		500
H	240				
		4420A			
J	265	4422A	M112 Alloy 4	57-74-1C	501
		4424A			
K	230		M369	11319	
M	403		M112 Alloy 11		
R	263	4490	M369	11319	501

*Solution Heat-treated. **Solution Heat-treated and Aged.

Light Gray Iron Castings Are Too Hard and Brittle

Under present conditions we are shifting from brass to cast iron for light castings weighing from 1 to 2 ounces. The iron runs readily, but the castings are hard and brittle. What alloy or alloys should be added to an all scrap charge to make the iron softer and tougher so that it can be drilled and tapped and also eliminate breakage. Should we use pig iron or scrap. Are any elements lost or reduced in remelting sprues and gates. If we have to use pig iron, what is the proper analysis. This is our first experience with gray iron.

From the evidence submitted we are inclined to the opinion that the most practical and satisfactory solution to your problem is to have the castings made in a malleable foundry. Malleable iron castings are soft, strong and tough to a greater degree than either gray iron or brass and should be used where they are subjected to shock or torsional stress. Obviously it is impossible to write a metallurgical treatise in the time and space at our disposal. Taking your questions in the order presented the following points are offered for your consideration. Hard and brittle small gray iron castings in many instances are rendered soft and machineable by raising them to a bright red heat and allowing them to cool slowly. This treatment does not increase the strength or toughness on a transverse or tensile test, but the castings may serve your purpose. Powdered ferrosilicon added to the metal in the spout or in the ladle will soften the iron. Lump ferrosilicon, or briquets may be charged in the cupola. A small amount of nickel has the same effect.

All iron loses approximately 5 per cent of the silicon content while passing through the cupola. The castings you are making require a silicon content of approximately 2.75 per cent. Therefore whether melting pig iron, scrap or gates and sprues, sufficient silicon must be added to raise the silicon content to the desired figure. This, of course assumes a knowledge on your part of the silicon content, in the raw material. Your castings can be made from a wide range of metal mixtures, either pig iron or scrap, providing the mixture is arranged to yield the following approximate analysis: Silicon 2.50 to 2.75 per cent, manganese 0.40 to 0.60 per cent, sulphur not over 0.10 per cent, phosphorus is immaterial, may be anywhere from 0.30 to 1.00 per cent.

Leakage in Valve Castings Is Due to Inadequate Feeding

We have been trying to cast brass valves in the 88-10-2 alloy without much success since they leak under a 60-pound water test. We are using a core for making the bottom of the valve, but are unable to get good, sound castings. Metal is melted in coke-fired, pit furnaces.

Leakage of your valves is not unexpected since the 88-10-2 alloy has a tendency to form microscopical passages at boundaries of its crystals unless the casting is fed adequately by heavy risers attached so that they are the last to freeze. Use of the core as you mention is standard procedure, and some producers have found it advantageous to incorporate in those cores, chills at various points to promote more rapid freezing. Use of chills will not eliminate shrinkage, but drive it to some other point to be handled by risers.

In some cases it has been found worth while to subject the castings made from the 88-10-2 alloy to a heat treatment from 3 to 5 hours at 1000 degrees Fahr., and cool slowly in the furnace. That procedure absorbs the delta constituent which is formed originally, and either prevents its reprecipitation or holds it to a sufficiently low amount. It is believed that formation of the delta constituent in any appreciable quantity causes seepage leaks.

Our suggestion would be to use another alloy containing less tin, especially in view of the tin shortage. One alloy would be the 88 per cent copper, 8 per cent tin and 4 per cent zinc alloy which is covered by government specifications. That alloy also must be risered adequately. An even better suggestion would be to use an alloy containing some lead since the 88-10-2, and the 88-8-4 alloys are hard to machine.

A valve alloy covered by one of the Navy specifications, and known as steam or valve bronze, contains 90 per cent copper, 6.5 per cent tin, 1.5 per cent lead and 2 per cent zinc.

Watch your melting conditions and see that the flues and grates of your pit fires are open to give fast melting. Do not permit any cold metal charged into the crucible to extend above the rim of the pot or crucible as it will absorb gases and carry them down into the molten bath. As soon as the metal comes up to pouring temperature, remove the crucible from the furnace, since the longer it remains in the fur-

nace the more unburned gas will be absorbed.

Be sure that the molds are vented well, and the cores also. See that every part of the casting is fed properly, and if necessary add fillets to sharp corners to eliminate trouble from that source. Advise your customer that such is required to obtain satisfactory castings.

Gives Formulas for Figuring Weight of Any Bushing

Do you know of any publication which gives the weight of bronze bushings from 1 to 12 inches diameter, 12 inches or more in length with various size cores?

We do not know of any publication containing an extended list of weights for bronze bushings in all lengths and diameters. The *Foundryman's Handbook*, published by the Penton Publishing Co., Cleveland, contains a section describing how to calculate the weights of all types of castings. With the aid of this material you can prepare your own list for ready reference. For example, the formula for estimating the weight of a hollow cylinder or bushing of uniform section thickness is: Weight equals $(d+T)$ TL $\times$ 0.817 where d is the small or inside diameter T is the thickness and L is the total length. Applying this to a bushing 8 inches inside diameter, 10 inches outside diameter 12 inches in length and 1 inch thick, the formula is $(8+1) \times 1 \times 12 \times 0.817 = 88.23$ pounds. A casting ½-inch in thickness weighs half that amount.

Naturally the weight will vary according to any other thickness or total length. The constant 0.817 given in the table is for gray iron. For bronze this is changed to 0.820. A second method which involves a little more figuring is to calculate the cubical contents of a solid cylinder with the outside diameter of the required bushing, then calculate the cubical content of the core and subtract one from the other. The result in cubic inches is multiplied by the constant 0.28 to give the weight of the bushing in pounds. Cubical content of a cylinder is found by squaring the diameter, multiplying by the constant 0.7854 and the result by the length. For example the formula for a cylinder 10 inches diameter, 12 inches in length is: 10 x 10 x 0.7854 x 12 or 940.48 cubic inches.

Describes Methods of Pouring Hollow Rolls for Paper

We shall appreciate any information on a method of pouring hollow cast iron paper rolls through pencil gates.

On account of the manner in which terms are employed loosely in the foundry industry we cannot decide whether you refer to the rolls through which the paper passes, usually known as calendar rolls, or to the dryer shells which help to convert the wet pulp into paper. Up to the present we have seen no reference to pouring the former type through pencil gates. The usual method is to pour them through a long upright runner outside the flask connected to a gate set at a tangent near the bottom. The same type of gate is employed on solid iron or steel rolls.

However, we see no reason why a row of pencil gates at the top should not serve satisfactorily. Dryer shells, plain cylinders, with necks cast on top and bottom in the smaller sizes and open at both ends in the larger sizes, are poured through a ring of pop gates on top. Procedure is similar to the method developed many years ago in the cast iron pipe shops and still practiced where the pipes are cast in pits in a vertical position. A flat ring core with the required number of small rectangular gate slots in the inner edge is set in a suitable seat on top of the mold. The ring core also holds the main core accurately in the center of the mold circle. A circular dry sand basin is placed on top of the ring core.

It is filled rapidly with metal and then kept full until the mold is filled. The individual small streams flow down alongside the main upright core and therefore do not strike the bottom with any force. A slightly different technique is employed where large dryer shells are made in loam molds. The top of the mold is left open. A circular cast iron runner basin with suitable holes in the bottom for the gates is lined with loam and dried. This basin is propped up from 4 to 6 inches above the top of the mold. When the metal in the mold rises to within a few inches of the top, the man at the ladle stops pouring. The remainder of the metal in the basin flows through the gates to fill the mold. With a little repair the basin may be used to pour several molds.

GANGWAY! By J. A. Patterson

"All I can get out of him is that it is just too damned hot!"

Casting Has a Blow Hole Over Hub

In making a small bell shaped bronze casting, six patterns are mounted on a plate with a cope runner in the center and a wide, thin vertical gate at each side of the large end of the core. Cores are oil sand made in a four-gang box and dried on end. The principal defect is a small blow hole or shrink on the cope side of the small hub. Many castings are cold shut or missrun on the bottom of the large end. We have raised the temperature of the metal to 3000 degrees Fahr. with resulting burning of the furnace lining and reduction of the life of a crucible to about six heats. Except on the small hub, the wall of the casting is only about 1/16-inch thick.

The chance of pouring bronze at a temperature of 3000 degrees is rather remote. It is exceedingly difficult to reach that temperature in a furnace and practically impossible to get that temperature in the metal in the crucible. The pyrometer should be checked to insure accurate readings. Regular periodic check on the accuracy of the pyrometer insures reliability of temperature control, absolutely impossible without such checking.

The blow, shrink or bubble over the small hub might arise from two causes, gas from the small core, or entrapped air carried forward by the rushing streams of metal from the present type of gates. Thin flat gates at each side would overcome this source of trouble. Possibly it might be objectional from the standpoint of cleaning room expense. The molds should be placed on the floor or on skids in position to prevent the metal from running indiscriminately in the various mold cavities with resulting irregularity of filling the cavities at different rates of speed. With the inclined mold the two lower cavities are filled first, then the second pair and then the two at the highest end. This will insure a more definite flow of metal to cover the large core area.

In an alternative gating method, the same style is employed, but the position of the patterns on the plate is reversed to bring the small ends close to the runner. A small vent is taken from the top of the far or large end of the casting. Air trapped by forceful pouring would escape through the vent. Metal in the hub would be hotter and consequently would refill any cavity formed by a blow from the core or an air bubble. Excessive amount of metal should not be forced through this narrow neck end to burn the small core and increase the tendency to blow. A vent opening in this small core readily may be provided by placing a small length of stock core in the end of the main core instead of making the entire core in one piece. A standard extrusion type core making machine can produce a stiff, dense core without a wire and with a proper vent through the center. This small core, well blacked, can be placed in the present corebox before the remainder of the core is rammed by hand, or rammed under a core blowing machine.

The result is a soft, open body core with a hard, stiff neck core firmly bedded in the end. A preferable method of making castings of the type under discussion, is to mold and pour them on end, either with a dry sand core, or with a green sand core left by the pattern. A runner leading from the central channel encircles the mold to which it is connected by a number of small thin gates. A small opening on top serves as a vent and riser. Obviously a new pattern plate would be required for this change in method, but a new plate would be infinitely cheaper than the present loss on a long order. This loss includes not only the labor of replacing the defective castings, but what is more important, the dissatisfaction of the customer, with orders to fill in a limited time, and with men and machines waiting.

Ball Castings Melt The Sand Face

A number of our white iron grinding ball castings come out of the sand with a thin skin which peels off in the tumbling barrel. The larger the ball the greater is the percentage which shows this defect. Our sand goes through a continuous system several times a day. We maintain the quality by the addition of new sand, but it is not put through a muller. Sand shows an average permeability of 65, green compression strength 2.9 and moisture 6.6 per cent. The iron is melted very hot to run the small casting molded in strings and connected by 5/16-inch diameter gates. Analysis of the iron is carbon 3.00 per cent, silicon 0.50 per cent, sulphur 0.13 per cent, phosphorus 0.15 per cent, chrome 0.40 per cent.

White iron poured at a high temperature reacts on sand with almost the intensity of steel. Sand must be highly refractory to produce a smooth skin on the casting. Your sand through continuous use and despite additions of new sand, has deteriorated, especially in high refractoriness. As a result the sand in immediate contact with the casting, fuses to form the skin which falls off in the tumbling barrel. By careful checking you will find that the affected castings are those nearest the sprue, and those poured first from the ladle in the event that a considerable number of molds are poured from a bull ladle. The fact that the larger castings are affected to a greater extent than the small castings bears out this theory.

Naturally a large body of metal is more destructive to the sand than a small body. Three suggestions are presented for your consideration. The first and most heroic remedy is to get rid of the present sand and replace it with sand of a more refractory quality. The second is to reduce the temperature of the metal either in the cupola or in the ladle. This may not be practical with the smaller balls, but readily may be applied to the larger sizes. . The third remedy is to increase the refractoriness of your present sand by incorporating approximately 10 per cent silica sand or silica flour in the mixture. The total amount may be reduced by preparing this special mixture and use it as a facing.

Want To Melt Steel In a Crucible

Can you suggest books or other form of literature dealing with the process of melting steel in a crucible furnace fired with oil? We also shall appreciate sources of information on melting bronze.

A comprehensive treatise on the crucible steel melting process forms one section, 34 pages, of *The Steel Foundry*, by John Howe Hall. The book also covers the open hearth, bessemer and electric furnace methods. Although the book is old, the basic principles of steel making remain the same and the information still is pertinent. Crucible steel melting has declined steadily for many years, principally due to the development and adoption of electric furnaces.

If you merely contemplate the installation of one or a small number of crucible furnaces, a close examination of all factors involved will show that you can buy steel castings from an established firm using other methods of steel making, much more cheaply than you can make them. Making steel by the crucible process is possible only in the hands of a man with highly developed skill and experience. It is altogether outside the scope of a beginner. Before entering this specialized and hazardous field we suggest you seek the advice of a competent professional steel foundry consultant.

Melting bronze, while requiring a certain technique and equipment is a much more simple process than melting steel. The subject has been covered extensively in THE FOUNDRY in a series of articles extending over a period of several years from July 1937 to the issue of October 1939.

Information about alloys...

GEARED

to industry's war needs

Converted to wartime tasks, American industry requires and calls upon us for information about alloys. Quickly available are practical answers to your questions about the selection, fabrication and uses of ferrous and non-ferrous materials containing Nickel. • Even before World War I, this Company pioneered studies of special alloys that provide added strength, toughness and wear-resistance. Our years of experience have been digested into printed reports and data sheets that help you save time and material. • Now, with all Nickel allocated where it may best speed Victory, our studies of alternative materials and processes become especially useful. • Upon request, personal assistance from our technical staff supplements the data in our printed bulletins.

NICKEL

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

men of industry

WILLIAM M. BLACK has been elected a vice president, American Brake Shoe & Foundry Co. Mr. Black has been president, American Manganese Steel Division, American Brake Shoe & Foundry Co. since 1940 and will continue in that capacity. He joined that division in 1912 and became its general sales manager in 1934 and vice president in 1935. Mr. Black served as a lieutenant of ordnance in World War I.

♦ ♦ ♦

STEWART TAME, formerly production manager, National Malleable & Steel Castings Co., Cleveland, has been appointed works manager to succeed CHARLES H. MCCREA who has been elected a vice president of the company. Mr. Tame joined National Malleable in 1923 following graduation from Case School of Applied Science, Cleveland. He was assigned first to the fitting and straightening department, and within a few months was transferred to the time study department. In 1926 he was appointed production manager, which position he held until his recent promotion to works manager.

♦ ♦ ♦

FRANK J. BALSLEY, formerly casting salesman, Otis Steel Co., Cleveland, has been made district representative for Frederic B. Stevens, Inc., Detroit, in the Cleveland territory. Mr. Balsley was born in Iowa and attended a public school of that state. He then served his apprenticeship with the Waterloo Gas Engine Co., Waterloo, Iowa, now the John Deere Tractor Co. Following service in the army during the previous war he became connected with the Pettibone-Mulliken Co., Chicago, as foreman and remained there for 3 years. Later he spent 7 years in charge of the molding and core making department of the Kensington Steel Co., Chicago. In 1933 he became connected with the Otis Steel Co. in Cleveland and remained with that organization until joining Frederic B. Stevens, Inc.

♦ ♦ ♦

PHILIP F. SMITH, secretary, Osborn Mfg. Co., Cleveland, has been appointed senior priority specialist with the War Production Board, Washington. Mr. Smith is a graduate of Dartmouth College, and is one of three sons of Franklin G. Smith, president of the Osborn company. Before becoming secretary of the company, Mr. Smith served as clerk, salesman, advertising manager and factory manager.

♦ ♦ ♦

MAJ. GEN. CHARLES T. HARRIS JR., assistant to the Army chief of ordnance, has been named commanding officer, Aberdeen Proving Ground, Maryland.

♦ ♦ ♦

WILLIAM F. TEMPLE has resigned as consulting analyst, priorities division, Cleveland field office, War Production Board to accept a position with the Cleveland Worm & Gear Co. and its subsidiary, Farval Corp. Mr. Temple is a graduate of the University of Michigan and served in the Ordnance and Salvage Departments of the Army, Boston district in the last war. He was the first member of the Cleveland office of WPB which he joined when it opened July 1, 1941.

♦ ♦ ♦

CHARLES I. WESLEY, president, Wesley Steel Treating Co., Milwaukee, has announced his candidacy for lieutenant governor of Wisconsin on the Republican ticket.

♦ ♦ ♦

CHARLES D. WIMAN, president, Deere & Co., Moline, Ill., has resigned to accept an appointment in the Army Ordnance Department. Mr. Wiman was a captain in World War I.

♦ ♦ ♦

J. A. CLAUSSEN has been appointed to the pig iron unit of the War Production Board, Washington. Mr. Claussen had been associated with the New York office of Rogers Brown & Lavino Inc.

♦ ♦ ♦

PHILLIPS W. CARBAUGH has been appointed chief metallurgist, Oliver Farm Equipment Co., Charles City, Iowa. Mr. Carbaugh formerly was assistant metallurgist, Mechanics Universal Joint Division, Borg-Warner Corp., Rockford, Ill.

♦ ♦ ♦

JOHN M. LUPTON recently joined the staff of Acheson Colloids Corp., Port Huron, Mich., as advertising manager. Following graduation from the University of Minnesota, Mr. Lupton was sales manager of a printing business, manager of development and merchandising in

(Continued on page 78)

Frank J. Balsley

William M. Black

Stewart Tame

Philip F. Smith

Woodward

●●●▬

Uniform

PIG IRON

WOODWARD IRON COMPANY

WOODWARD, ALABAMA

America's Largest Completely Integrated and Entirely Independent Merchant Iron Producer

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

(*Continued from page* 76)

metal products, and for the past two years he has been advertising manager, Robins Conveying Belt Co., Passaic, N. J.

♦ ♦ ♦

LEROY E. EVERETT for the past 2 years foundry superintendent, Kaukauna Machine Corp., Kaukauna, Wis., resigned recently to accept a commission as major in the United States Army. As a student in the University of Wisconsin during the first World war he left school to serve as an aerial gunner in the 182nd U. S. Aero Squadron in France. In 1921 he started his foundry career as a special apprentice at the Indiana Harbor Works of the American Steel Foundries. Since that time he has had a wide and varied experience as research engineer, Nugent Steel Castings Co., Chicago; foundry engineer, Illinois Clay Products Co., Joliet, Ill.; superintendent Stockham Pipe Fittings Co., Birmingham, Ala., superintendent Warman Steel Castings Co., Los Angeles; and foundry manager Key Co., East St. Louis, Ill.

♦ ♦ ♦

DAVID LOGAN and FRANK W. PEDROTTY have been appointed district sales representatives of the American Foundry Equipment Co., Mishawaka, Ind. Mr. Logan will have headquarters in Newark, N. J., and Mr. Pedrotty in Philadelphia. Mr. Logan has been associated with the American Foundry Equipment Co. since it was organized in 1908. Mr. Pedrotty, a native of Dennison, O., and an engineering graduate of Notre Dame University, joined the engineering department American Foundry Equipment Co. in 1926.

♦ ♦ ♦

PAUL E. KIEFER has joined the West Michigan Steel Foundry Co., Muskegon, Mich., as plant engineer. He is a graduate mechanical engineer from Ohio State University and has been employed by the United Engineering Co., Canton, O., Ohio Malleable Iron Co., and Columbus Malleable Iron Co., Columbus, O. For the past 11 years Mr. Kiefer has been associated with Edwin S. Carman Inc., Cleveland.

♦ ♦ ♦

B. P. MULCAHY, research engineer, Citizens Gas & Coke Utility, Indianapolis, has been elected chairman of the Central Indiana Chapter of the

B. P. Mulcahy

A.F.A. Mr. Mulcahy graduated in 1925 from the University of Illinois as a chemical engineer. He served as chemist and chemical engineer in the by-product coke department, Associated Gas & Electric Co., Geneva. N. Y., 6 years. In 1928 he joined the Consumers Gas & By-Product Corp., Terre Haute, Ind., as chief chemist and in 1936 became research engineer with the Citizens Gas & Coke Utility, Indianapolis. In addition to his membership with the A.F.A., Mr. Mulcahy is active in the American Society for Testing Materials and the American Gas Association.

♦ ♦ ♦

L. CLAYTON VALLIER, treasurer, Buffalo Foundry & Machine Co., Buffalo, has been elected treasurer, Buffalo Control of Controllers Institute of America. WALTER H. WINTER, Symington-Gould Corp., Rochester, N. Y., was re-elected secretary.

♦ ♦ ♦

WILLIAM M. BIRS, Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., has been elected treasurer, Hartford Control of the Controllers Institute of America.

♦ ♦ ♦

FRED H. ALLEN, auditor, American Laundry Machinery Co., Cincinnati, O., has been elected president, Cincinnati Control of the Controllers Institute of America.

♦ ♦ ♦

JOHN R. TUTTLE, controller, Crouse-Hinds Co., Syracuse, N. Y., has been elected a vice president, Syracuse Control of the Controllers Institute of America.

♦ ♦ ♦

C. GRANNIS BONNER, formerly comptroller-treasurer, Brunswick-Balke-Collender Co., Chicago, has been elected treasurer, Pomona Pump Co., Pomona, Calif.

♦ ♦ ♦

ROBERT H. PYLE has been appointed district representative, McKenna Metals Co., Latrobe, Pa., in southern Indiana. His headquarters are at 3801 College avenue, Indianapolis.

♦ ♦ ♦

ROBINSON D. BULLARD, reclamation engineer, Bullard Co., Bridgeport, Conn., has been appointed technical consultant to the Industrial Salvage Section, Bureau of Industrial Conservation, War Production Board. Mr. Bullard will assist in preparing a definitive book on industrial reclamation.

♦ ♦ ♦

W. D. MOORE, president, American Cast Iron Pipe Co., Birmingham, Ala., was presented the Fuller memorial award for the Southwestern section by American Water Works Association, at its annual meeting held recently in Chicago. The award is given annually to members of the association for dis-

(*Concluded on page* 80)

Leroy E. Everett

David Logan

Frank W. Pedrotty

Paul E. Kiefer

It's not easy to get new core ovens installed in a hurry today. So, if you want to turn out more cores, one quick, easy way is to start using Truline Binder.

With Truline in your core room you'll produce more cores on every shift with the ovens you now have—maybe twice as many. That's because Truline-bonded cores bake in much less time. And if you have conveyor-ovens, Truline will cut out at least one of the extra trips through, for large cores.

When it comes to knock-out of cores and cleaning castings Truline will save your time, too. It burns out fast, so that sometimes the cleaning job only takes a half to ⅔rds as long.

Truline Binder is cutting costs and boosting output in foundries producing steel, grey iron, malleable, and nonferrous castings. It may do it for you. To find out more about it, why not talk it over with the Truline service man. Just clip the coupon to your letterhead and mail it today. We'll see that you get the dope.

NAVAL STORES DEPARTMENT

HERCULES POWDER COMPANY

INCORPORATED

999 MARKET STREET · WILMINGTON, DELAWARE

Please send ☐ sample ☐ information on how to use Truline Binder in casting: .....
(state type of work and kind of metal cast)

.....

*Name*_____

*Company*_____ *Title*_____

*Address*_____ *City*_____ *State*_____

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(*Concluded from page 78*)

tinguished service in the water supply field.

♦ ♦ ♦

GEORGE K. DREHER, works manager, Ampco Metal Inc., Milwaukee, has been elected president of the Wisconsin Chapter of the A.F.A. Mr. Dreher was born May 24, 1905 in Calumet, Mich., and moved to Milwaukee at an early age. After attending Lawrence College, Appleton, Wis., he spent some time managing and directing boys camps. He joined the Ampco Metal organization in 1930 and served as foreman during 1932 and 1933. Succeeding positions included supervisor, superintendent, plant manager and in 1941 he was appointed works manager. In addition to his duties with the Wisconsin Chapter of the A.F.A., Mr. Dreher has been active in the affairs of the Milwaukee Chapter of the American Society for Metals, is a member of the Rotary Club, City Club, the board of the Family Welfare Association, and in 1941 was elected to the Institute section, American Institute of Mining and Metallurgical Engineers.

♦ ♦ ♦

C. F. CARSON, superintendent, foundries division, National Supply Co., Toledo, O., recently was elected chairman of the Toledo Chapter of the A.F.A. Mr. Carson was born in Glasgow, Scotland, and was apprenticed in the Saracen Foundry, Glasgow. During a 6-year apprenticeship, he spent 3 years at the Glasgow and West of Scotland Technical College, from which school he was graduated in applied mechanics. During the following 6 years he worked as a patternmaker, molder and draftsman in England, Ireland and Scotland. In 1902 he joined the Westinghouse Steel Foundry, Manchester, England as assistant superintendent and from 1903 to 1906 served as superintendent of that plant. He then came to the United States and for 6 months was with the Midvale Steel Co. His next connection was with the Sterling Steel Foundry, Braddock, Pa., where he served as foundry superintendent for 3 years. In 1910 he became foundry superintendent, Wellman, Seaver, Morgan Co., Akron, O., and in 1920 joined the National Supply Co., Toledo.

♦ ♦ ♦

C. B. SHANLEY, secretary and treasurer, Semi-Steel Casting Co., St. Louis, recently was elected chairman of the St. Louis District Chapter of the A.F.A. Mr. Shanley was

C. B. Shanley

born March 5, 1893 in Granbury, Tex. He received his technical education at Washington University, St. Louis and the University of Michigan, Ann Arbor, Mich. He has been connected with the following foundries: St. Louis Malleable Casting Co., St. Louis; Foundry & Machine Products Co., Detroit; Whitehead & Kales Foundry Co., Detroit; and he joined the Semi-Steel Casting Co., St. Louis, in 1923.

♦ ♦ ♦

JAMES E. CROWN, master mechanic, U. S. Naval Gun Factory, Washington, recently was elected chairman of the Chesapeake Chapter of the A.F.A. Mr. Crown is a native of Washington and obtained his technical training at George Washington University. In 1904 he started work as an apprentice for the government and in succession was advanced to molder, estimator, and supervisor. In 1916 he taught high school in New York, returning to the government as a supervisor the following year. In 1919 he was appointed to his present position as master mechanic.

♦ ♦ ♦

EARL ANDERSON, president, Enterprise Foundry Corp., Los Angeles, recently has been elected chairman, Southern California Chapter of the A.F.A. Mr. Anderson was born in San Francisco, the son of Albert E. Anderson, one of the four partners who organized the Enterprise Foundry Co., in San Francisco in 1886. He served an apprenticeship in that foundry and later was appointed foreman in one of the additional foundries acquired by the company. From this position he was transferred to the sales department. About 12 years ago he was placed in charge of the company's foundry in Los Angeles which he purchased a year ago. Mr. Anderson has been actively identified with the foundry industry and with the organization and progress of the Southern California Chapter of the A.F.A.

Book Review

Magnetic Tools and Appliances in Engineering Production, by E. Molloy, 116 pages, 5½ x 8¾ inches, cloth, published by the Chemical Publishing Co. Inc., Brooklyn, N. Y., $2.50.

Application of magnetism in industrial engineering is covered in this book. Applications include magnetic chucks, magnetic clutches, lifting magnets, magnetic separators and equipment designed for magnetic detection of flaws in engineering materials. Each application is described in detail and the book includes numerous photographs and line drawings to illustrate the text.

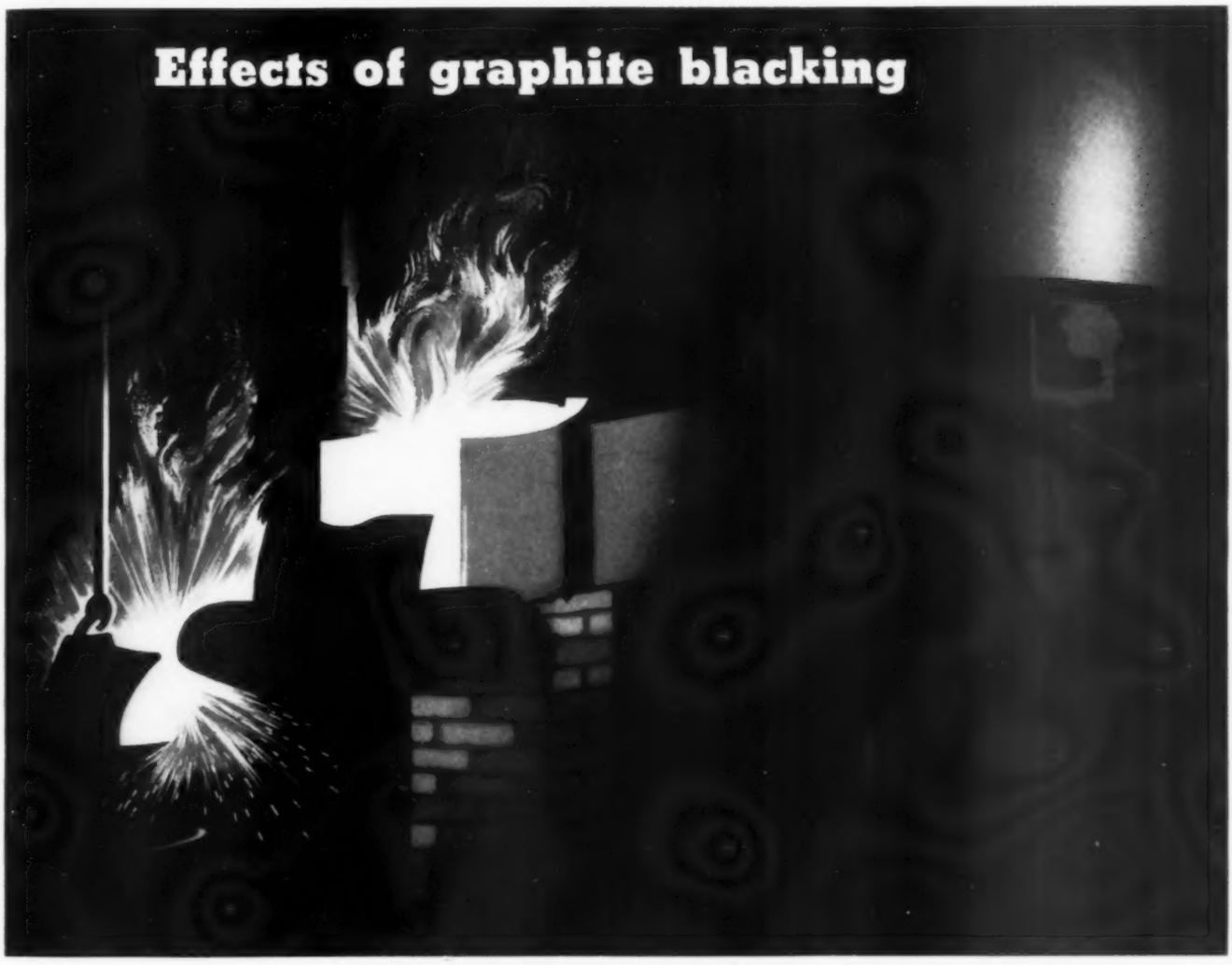
George K. Dreher

Earl Anderson

C. F. Carson

J. E. Crown

Effects of graphite blacking



Information taken from "The Foundry"

It has been known for some time that the addition of a comparatively small amount of graphite to molten cast iron causes considerable graphitization. The results are reduced chilling tendencies and increased graphite growth.

The possible effect of black washed cores and molds has possibly not been given the amount of attention that it deserves.

Failure to take account of the effect may easily result in castings being rejected for porosity or faulty structure. This is particularly likely if the iron tends towards softness.

Analysis will not usually disclose any carbon pick-up. Nevertheless, the action of amorphous graphite is intense enough to cause marked structural changes.

On the other hand, if reasonable control is exercised, using graphite on the surfaces of molds and cores can be made to work to advantage. This holds especially in cases whose casting surfaces are normally too hard.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
MOLYBDIC OXIDE—BRIQUETTES FOR THE CUPOLA · FERROMOLYBDENUM FOR THE LADLE

Climax Mo-lyb-den-um Company
500 Fifth Avenue · New York City

MOLY

BY A. H. ALLEN
Detroit Editor, The Foundry

THIS is a steel war, not a cast iron war, said Lieut-Gen. W. S. Knudsen, in a recent address at Flint, Mich. Actually he might have gone a little further and said that it is an aluminum and magnesium war, not a ferrous war; but in truth, it is a war of all metals, both ferrous and nonferrous, both cast and wrought. To confine the battle to steel alone is oversimplifying the matter. Without one metal, we cannot have another.

Cast iron has its uses, and will likely find more as the combat progresses. There are few foundries in this district which are not loaded down with orders for castings. Obviously they will not all go into the fighting; but for the tools, the jigs, the fixtures, the dies, the machine bases and a host of other parts cast iron is finding ample demand. Even in some designs of tanks, gray iron transmission case castings have been approved and are now in production.

Large quantities of cast iron are required for all types of engines going into on-land vehicles for combat and transport—trucks, jeeps, peeps, searchlight generators, tanks, armored cars and the like. Cylinder blocks for all these engines are of cast iron.

Immense Number Needed

For air engines, aluminum and magnesium get the call because of their lower unit weight, but foundries must still apply their casting techniques to these lighter metals. The airplane engine cylinder head of the type used on radial engines represents one of the most complicated castings ever produced and these are being required in ever-increasing numbers. For example, one estimate of the number of radial engines to be built in this country by the end of next year is around 50,000 a month. Figuring an average of 14 per engine, which would not allow much margin for spares and replacements, this would mean 700,000 cylinder head castings a month from aluminum foundries.

Industry observers are watching closely developments at the new Buick $10,000,000 aluminum foundry which is now on the verge of active production. Cylinder head castings have been produced at Buick for several weeks, but in a temporary setup erected in the gray iron foundry pending completion of the new aluminum plant. Some new ideas in molding and coremaking are expected to speed output of these castings. Heads have been ticklish castings to mold because of the many closely-spaced fins which require intricate wire supports in the molding sand. The possibility has been suggested of making aluminum cylinder heads in permanent molds in the interests of lowering the time required for preparing sand molds and cores. This matter is reported being given some investigation.

Plan Magnesium Foundry

Plans are understood to be in a preliminary stage for a new magnesium foundry in this district which will cast airplane wheels from the light metal. Not operated by one of the motor companies, the plant has a projected output of around 200,000 pounds a month. Samples of the wheels are now reported undergoing flight tests.

Packard is in process of refurnishing its gray iron foundry for production of aluminum castings for the Rolls-Royce Merlin airplane engine now in production at Packard. Current rates of assembly of this engine are going to be doubled by next year, so it will be necessary to supplement outside sources on aluminum castings. It will probably be a couple of months before equipment is installed and in operation, though some temporary production may be seen before this time.

One of the tightest bottlenecks in the airplane engine field is in forged steel cylinder barrels. These alloy steel forgings must be made under the most rigidly controlled conditions, both in steelmaking and forging. Magnaflux inspection, analysis certification and other insurance against defective pieces must be undertaken. Finally, in the machining, about 70 per cent of the steel is removed as turnings and grindings.

Already, experiments have indicated the success of centrifugally casting these barrels. Ford, in particular, is producing this type of casting, relieving the bottleneck in forging equipment and reducing the amount of machining which must be done to obtain a finished piece. A leading executive with one of the well-known engine builders offered as his opinion that a centrifugally cast cylinder barrel to which is brazed a forged steel cap or valve plate would have interesting possibilities for use in liquid-cooled in-line engines, instead of the all-forged barrel.

Foundry equipment is being pressed as never before in recent years, and occasionally it is sagging under the strain. Some foundries find this equipment is quite old and logically can be expected to show the strain of all-out production. The result is bound to be more frequent breakdowns and an added load on maintenance crews.

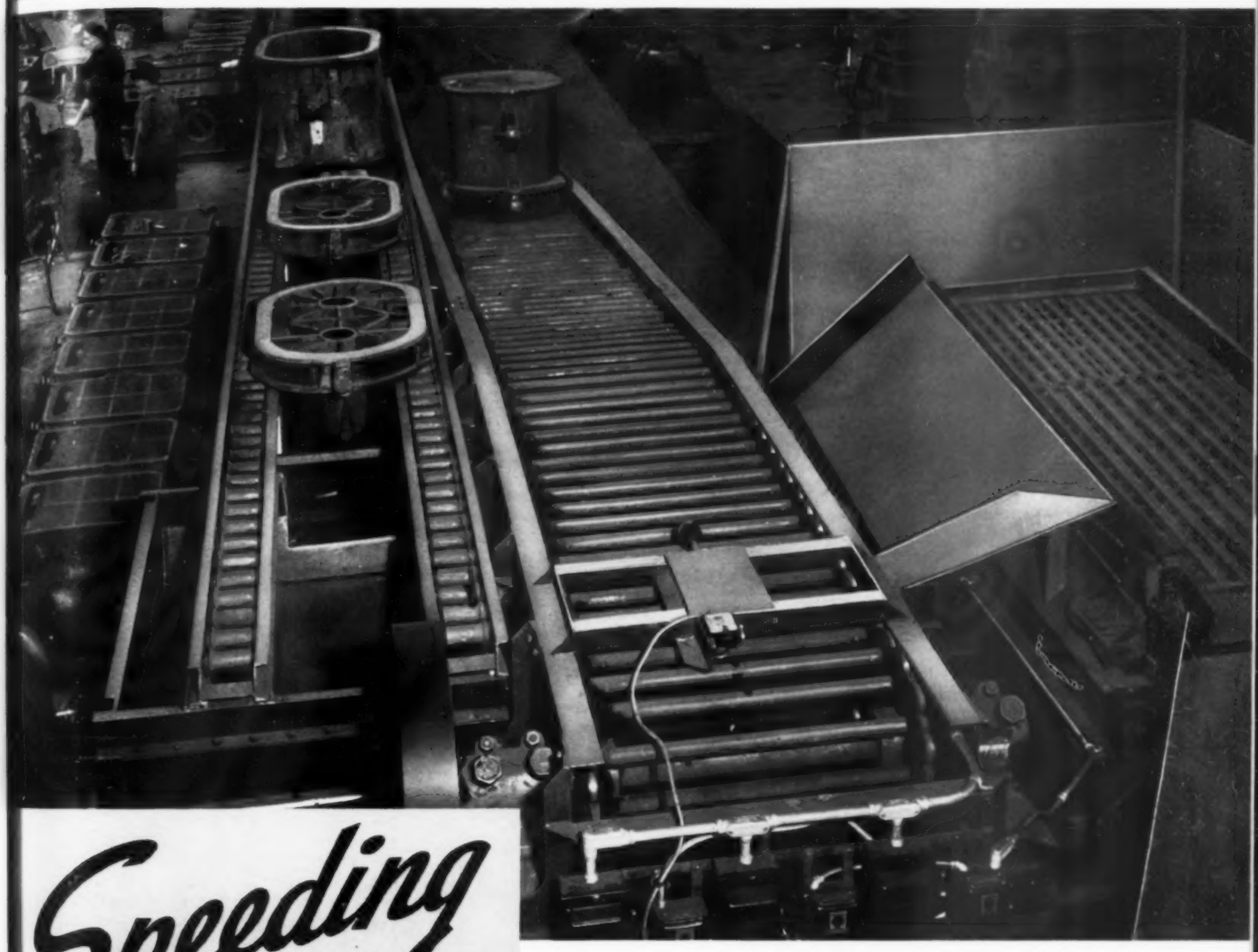
Ingenuity Overcomes Problem

One instance related here, aptly showing how ingenuity in emergencies is helping to overcome unforeseen difficulties, is the case of a medium-size foundry which has been in business for nearly half a century and now is turning out more castings than ever in its long history. The other day a sewer suddenly became clogged and stopped up the disposal of cooling water. Emergency crews were enlisted to pump water into the street until a contractor could dig up the sewer and repair it. Thirty-year old blueprints of sewer construction were dug up to guide the repair men. When the line finally was unearthed it was found that it was of a considerably smaller size than indicated on drawings, indicating some "fast work" on the part of the original builder. However, the line was rebuilt and placed back in service in a matter of a few days.

No sooner had this difficulty been overcome than a traveling crane broke one of its main truck wheels

(*Concluded on page 84*)

MATHEWS CONVEYERS FOR MECHANIZED HANDLING

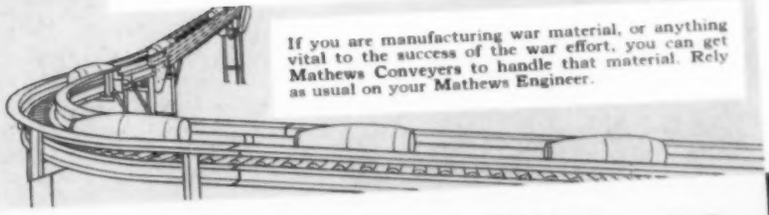


Speeding THE TOOLS OF Victory

● TIME WAS NEVER MORE PRECIOUS than in this national emergency. Every step that can be saved . . . every unnecessary motion that can be eliminated . . . every ounce of energy that can be conserved helps to speed the tools of victory.

Keeping munitions, materials, and machinery supplies moving faster and with less worker fatigue is the function of Mathews Conveyer Systems.

Mathews engineers have helped hundreds of manufacturers of war material speed up production schedules with no increase in man-and-machine hours!



If you are manufacturing war material, or anything vital to the success of the war effort, you can get Mathews Conveyers to handle that material. Rely as usual on your Mathews Engineer.

MATHEWS CONVEYER CO.

Ellwood City, Penna.

(*Concluded from page 82*)

and was out of service. Crane builders said it would require two or three weeks to replace the wheel, so the foundry maintenance crews set to work with welding torches and boiler plate to build their own crane wheel. This was done and the crane returned to service in a few hours. It is still running, though the plant manager still has his fingers crossed until a new wheel can be shipped.

Dodge Chicago Plant, division of Chrysler Corp. is being rushed to completion, and personnel is being recruited and trained to take over operations which will get under way late this year. Radial airplane engines of an unusually large size will be built there, and scores of Detroit technicians will have to be transferred to the Windy City. The plant will include a large aluminum foundry, as well as other facilities for machining, testing and assembling engines.

Form letters have been circulated throughout this territory on the subject of the "lycopodium shortage". Nonfoundrymen who have seen the letters have been nonplussed to say the least, not knowing whether lycopodium was a hair restorer or a foot-ease. It is of course a rather expensive parting compound used occasionally in intricate casting work where fine parting is desired. The yellow powder is derived from the spores of a species of club moss largely imported, it is said, from Russia. Currently it sells for about $10 per pound, many times the cost of conventional parting compounds.

So, if the Germans capture the lycopodium fields of Russia, or the Russians have to scorch the earth to keep the enemy away from the precious growth, lycopodium may come to be just a word in the foundryman's lexicon, instead of a fine yellow powder which used to get in his eyes.

Explains Procedure For Brass Shops

Effect of the new allocation classification system on brass and bronze foundries obtaining metal was explained recently in a statement issued by the Copper Branch, War Production Board. After July 31, the brass and bronze foundry must report its deliveries to customers during the previous month on Forms PD-123A and PD-123B, showing by the use of a simple set of symbols the final end-use of products in each shipment. On the basis of this report, and the application form PD-59 revised, the foundry will be allocated new material to replace that shipped. The WPB will be able to tell, from reports showing end-uses filed by foundries, into what finished products the new material is going. Thus, allocations can be made so as to guarantee fulfillment of practically all essential war orders.

In order that the foundry may know exactly how its product was used and may report to WPB fully, the foundry must obtain from each customer the appropriate allocation classification symbol and purchaser's symbol, to show the end-use of material delivered on that order. This information is to be included on the purchase order. Form PD-175 was formerly provided for this purpose but its use was suspended on June 29. After June 30, 1942, users of castings containing copper may not obtain delivery without supplying the foundry with this information.

Some question exists among foundries as to whether end-use must be reported for orders placed some time ago. The Copper Branch has stated that any delivery made after June 30, 1942, must be reported on Forms PD-123A and PD-123B, even though the order was placed many months ago. All users of castings, including the Army and Navy, will specifiy the end-use of material purchased by them, so that foundries may make complete reports to WPB on Forms PD-123A and PD-123B.

End-use Is Important

It was explained that end-use is a very important consideration. Although an order carries a low rating, it may be vital to the war program. Therefore, it is important that certain orders bearing preference ratings lower than A-1-k be received and be reported to WPB for possible authorization. The following are end-uses for which the Copper Branch will seriously consider authorizing copper if the orders should bear a rating lower than A-1-k: Railroads; streetcars; buses; public utilities; maintenance and repair of essential industrial equipment; mines, petroleum industry; water works; hospitals and health supplies; maintenance and repair of schools; textile industries engaged in production of material for Army or Navy use; defense housing (critical list) in specific areas designated by the Building and Material branch as being essential for war purposes; fire-fighting equipment; essential repair for farm machinery; essential repair for elevators; essential repair for food preservation machinery and dairy equipment; essential parts for road-building equipment.

The Copper Branch also has pointed out that foundries can help war production a great deal by reducing their consumption of electrolytic copper and No. 1 copper scrap. Ammunition requires the high-grade metal, and many castings can be made satisfactorily with lower-grade copper.

All Employes Are Buying War Bonds

100%
JUNE 29• 1942
WE'RE BUYING AT LEAST 10%
•EVERY BODY EVERY PAY DAY•
FOR YOUR COUNTRY'S FUTURE AND YOUR OWN
Save With
WAR SAVINGS BONDS
AVERAGE EACH WEEK $5.14 PER WORKER
JUNE 29• 1942
MAY 29th 1942
92% OF THE WORKERS IN THIS PLANT ARE BUYING WAR SAVINGS BONDS BY MEANS OF VOLUNTARY PAYROLL DEDUCTIONS.
ARE YOU BUYING YOUR SHARE?
MAY 29th 1942
AVERAGE $3.23 EACH WEEK PER PARTICIPANT

THE July issue carried a news story on the award of the Minute Man Flag to the Hamilton Foundry & Machine Co., Hamilton, O., in recognition of the fact that 92 per cent of the employes of that company were purchasing War Savings Bonds through voluntary payroll deductions. After the issue was on the press, Peter Rentschler, president of the Hamilton company, called to tell us that the company had gone all out for the war effort and that now 100 per cent of employes were investing at least 10 per cent of their pay in War Savings Bonds. A new sign on the plant, as shown above, tells the story.

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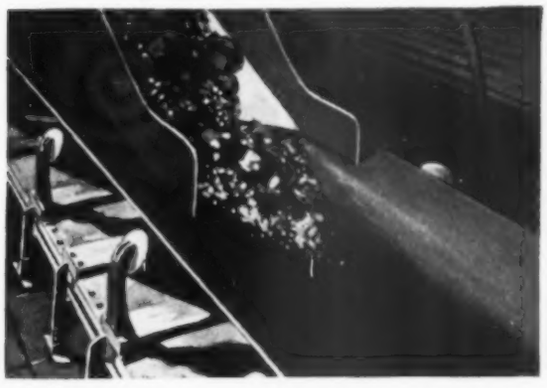
THIS NEW 48-PAGE BOOKLET

is for managers, engineers and plant operating men. It shows how to conserve rubber through proper handling, installation and care by methods such as those illustrated below. Other subjects covered are molded goods, rubber covered rolls, rubber mountings, rubber printing materials, mats and matting, grinding wheels, electrical wires, cables and tapes. Free copies will be sent on request. Write the Mechanical Goods Division, Dept. 17, United States Rubber Company, at address below.



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the adventures of Bill

BY PAT DWYER

Drawings By RICHEY

CONTRARY to his usual gabby habit, one night recently Bill sat for a long time saying nothing. This prolonged silence was not due to lack of opportunity. During the same period I also said nothing. The field was open, but he sat there like the Sphinx of Egypt, or that other equally well known character Ol' Man River, who according to the country wide report by radio, stage and screen a few years ago, "Don't say nothin' but just keeps rollin' a-a-long."

To be strictly accurate, the comparison to these two historical characters is not exact in every particular. 'Tis true Bill was silent and he was sprawled out in a very careless and undignified position, but obviously through a difference in certain anatomical features he could not arrange the paws and the hind legs in a manner to compare with the Egyptian stone masterpiece. Also his hour's silence was only a negligible and insignificant trifle when one considers that old John Q. Sphinx, the original No. 1 Gink—my error—Sphinx, has withstood the swirling and blinding sand storms of the desert for over 4000 years and in all probability will still be gazing down the ancient and winding valley of the Nile until time and tide are no more.

The comparison to Ol' Man River is a little closer. In addition to his silence, Bill don't plant taters, he don't plant cotton, and although them that plants 'em is soon forgotten, Bill, like the great turgid, silt laden flood that drains the equally ancient Mississippi valley, just keeps rollin' a-a-long.

Since the effort required no undue mental exertion, I wondered idly what he was thinking about. From his appearance one might infer that he was engaged in the somewhat painful process known as examination of conscience. The theory admittedly had its weak points. First, I was not sure that Bill had a conscience. Second, if he had one, why should he be looking it over at this time of the year with last Easter back over the hill, and next Easter a dim and more or less nebulous spot in the far away and somewhat problematical future. Third, I have seen man wearing the same intense, brooding look when suffering from falling hair, toothache, pink tooth brush, an over due note at the bank, botts, spavin, ingrowing toe nails, tight shoes, or a hint from the little woman that darling Mamma was closing her home R. R. 2, Goose Hollow, Iowa, and with dear little Junior and two pet cats, was coming to stay for the winter.

More probably, I reflected, the old boy was wrestling with the perennial problem of where to get enough jobs with an A-1 rating to fill his shop, and after he got them, where he was going to get enough pig iron and scrap to cast them. Maybe he was wondering whether it would be advisable to ask his boss for an appropriation to build a small dog house on the outside of the present dog house to house the additional clerks, book keepers and time keepers required to keep track of all the dog house material flowing out of the paper mills in Washington and delivered to him faithfully every day.

Well, well! Fancy seeing you here

Perhaps the honest fellow was brooding on the injustice of forcing the poor humpback mail man to carry the additional burden without extra compensation. A dog's life, any way you look at it. I should not be surprised to find him revolving a scheme to conscript a flock of big and little, healthy, lazy dogs, at present eating their heads off in sloth and idleness, conscript them and put them to work carrying the mail, and thus release the present carriers to take up jobs more essential to emergency conditions. Why not? St. Bernard dogs have been toting little barrels of brandy up and down the snow covered Alps for years. It should be easier to carry a load of letters than a load of Koneyack. With a view of putting my mind reading to the test, I suggested to Bill that this idea had considerable merit.

"Well," said Bill, "I'll tell you. By a curious coincidence I was trying to figure out some suitable way of —well, let us say—rewarding a big yellow brute who tried to eat me alive not so long ago."

"Eat you alive! Impossible. How could you be so cruel. Think of the poor little innocent creature, man's faithful companion and household pet, dying in great agony. You should show greater consideration—"

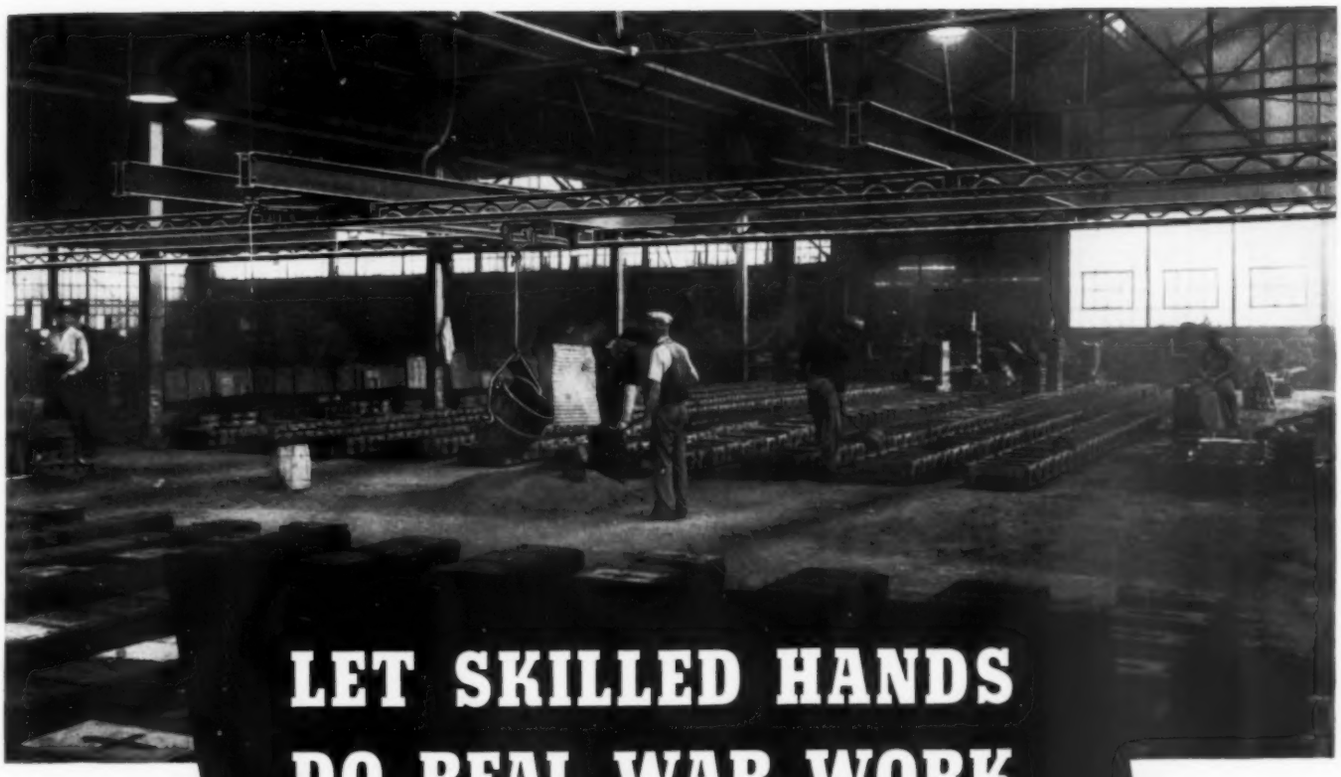
"Where do you get that poor little innocent creature stuff? This fellow is almost as big as a $40 cow and looks like a cross between a mountain lion and a Bengal tiger, with all the worst characteristics of each."

"Where did you have the pleasure of meeting this playful little creature? In the zoo?"

"I did not meet him in the zoo, but if I can get a couple of good reliable thugs to snatch him some dark night, that is where he will wind up. I was thinking of dropping a bomb in his nest, but that would be too quick and easy.

"This particularly o b n o x i o u s brute, a Great Dane about 2 feet

(*Continued on page* 88)



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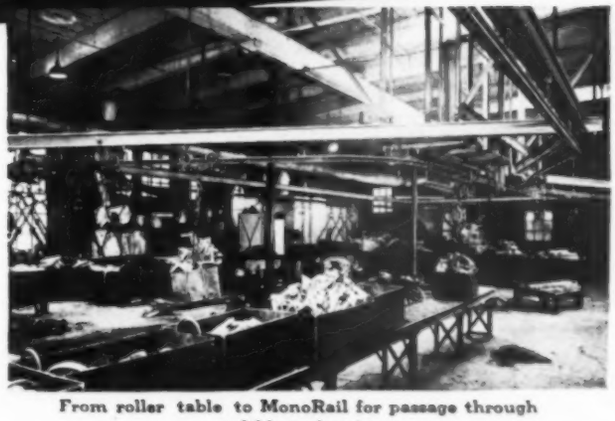
American MonoRail Systems are playing a vital part in speeding up production in hundreds of plants engaged in war work. Supplied for manual, electric or automatic operation. There is no interruption during installation. Call in an American MonoRail Engineer — he will show you how it can be done in your plant.



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Castings removed from platforms by air lift to MonoRail Trolleys.

WRITE FOR Blue Book illustrating hundreds of MonoRail installations.

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(*Continued from page* 86)

high at the water line, 5 feet 6 inches between perpendiculars and displacement about 250 pounds, lives up the street. If he was hooked by the neck to a derrick—and I wish he was—and held up vertically, one would need to open every joint in a 6-foot zig-zag rule to mark the distance between his hind feet and the tip of his broad and supercilious snout.

"If there is anything in the widely held belief in reincarnation, I am quite sure that in a former state of existence, this blot on the landscape, this menace to honest wayfarers, campaigned with Genghis Kahn, with Attila the Scourge of God and in all probability was swinging a sword as long as himself when Henry Morgan set the torch to Cartagena and Panama City. If a dog can think—a hotly debated point between owners and lucky nonowners—this lad probably sheds salty tears at night when he thinks of what he is missing in Europe and Asia with the gory descendants of these wild and lawless boon companions of other days.

"As an ordinarily well behaved and reasonable person, I am willing to admit he has as much right to existence as I have. What I resent is his apparent stubborn belief that he holds all the right, and I have none. I submit, that is going too far. I am willing to live and let live, as the saying goes. This cantankerous canine seems to favor placing the period immediately after the first live.

"The first time I saw him, he was standing catty corner on the side walk along which I was traveling sedately on my own two feet, under my own power and minding my own business. As I drew nearer and nearer I naturally assumed he would give me room to pass, either by moving off the side walk, or by assuming a position parallel to the sides. He did not move. Just stood there like a graven image, head erect and with his baleful yellow eyes gazing straight through and beyond me.

"By a curious and involuntary trick of memory my mind jumped back 20 odd years to another figure with the same erect military carriage, fierce little eyes, square iron face and hanging jowls. Lacking only a spiked helmet and moustache, the combination—to use a favorite expression of my old uncle Malachi—wuz the livin', spittin' imidge iv the main guy in the German army when we were over there before. The old boy had quite a line.

"This present lump of obstinacy also had a line. In haughty defiance of my legal right to pass peaceably, this misbegotten and probably left hand refugee from Baskerville blocked the way. Should I attempt to assert my rights as a citizen, free, white and twenty-one, by boldly shouldering him to one side? Should I give him the usual signal to indicate that I intended to pass port or starboard? Should I snap my finger, murmur 'Nice doggie' and trust that this display of camaraderie would induce him to courteously shift his big lump of a body far enough to one side to allow me to pass without stepping off the curb?

"A moment's reflection caused me to reject the first and second suggestions. The first because while I was quite certain of my status as a citizen, I was not certain the dog was familiar with this important fact. His close resemblance to certain massive guardians of the public peace convinced me of the utter futility of trying to explain anything to him. As for shouldering him to one side—well—it looked like one of these jobs which should be handled by deputy — Paul Bunyan for choice or Goliath of Gath.

"The second alternative was rejected for the same reason that would prevent me from attempting to pass a mud scow anchored across the fairway at low tide. Like the Normandie, he apparently was squatted for the duration.

"My third and last shot in the locker, the pat on the head and the nice doggie stuff did not go over so good. The hostile brute opened his mouth to expose as fine a set of fangs as ever I saw in a crocodile, jerked his head forward, said G-r-r-R in a particularly nasty manner and in a tone like that produced by the far left keys on a piano, and in general indicated that he was no nice doggie, and definitely was no friend of mine."

"These big dogs are right friendly," I said. "He had no intention of biting you. You should have tickled him behind the ears."

"Tickled him, Hey? I should like to tickle him with the butt end of a rammer, and it would not be behind the ears. I hopped nimbly out of the way and then crossed the street. When I happen to go up that way now, I walk up the east side of the street, irrespective of whether he is in sight or not on the west side.

"We all have our troubles. I had a letter recently from a man who wrote that he recently made four large bronze pipes flanged at both ends, 1-inch thick in the body, 45½ inches diameter and 62½ inches in length, weight 4200 pounds. The molds were made in succession in the same flask and dried in the oven. The metal was poured through a single sprue near the center at one side of the flask. A long runner in the drag joint carried the metal to a gate into each flange. Sand between the runner and the mold in the drag joint was reinforced with a row of 4-inch nails. Three castings were satisfactory. In the fourth mold the sand between the runner

(*Concluded on page* 138)

And then she said "O Death where is thy victory. O Grave where is thy sting?"

RALPH W. HISEY

Record: **Started with Osborn organization over 29 years ago soon after the company first began manufacture of moulding machines. Early became identified with improved production methods. Now Vice President, The Osborn Manufacturing Company, head of Machine Division in charge of manufacturing operations.**

For 29 Years His 29-year record fights on today's Production Front

Production engineering is the term that best describes Ralph Hisey's major contribution to the business with which he has grown up for 29 years. Closely coordinating engineering and manufacturing operations, it has been his constant aim to build more and more quality into Osborn Moulding Machines by means of ever greater production efficiency.

Key foundrymen throughout the country know Ralph Hisey for his thorough and practical understanding of foundry requirements. But they know him best for the way he and the organization he directs consistently build that understanding into the superior performance that characterizes every Osborn Moulding Machine.

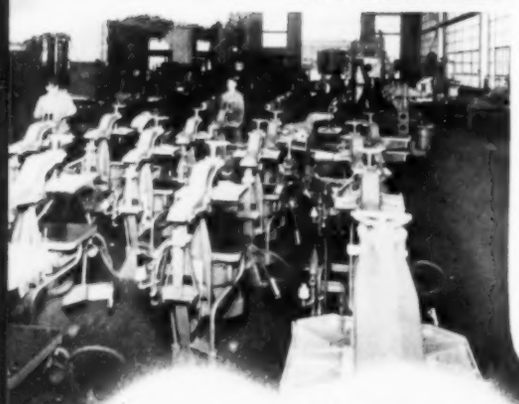
THE OSBORN MANUFACTURING COMPANY

5401 Hamilton Avenue, Cleveland, Ohio

OSBORN

MOULDING MACHINES

Yesterday's Planning



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Close study and control of manufacturing operations has been an Osborn policy for many years. Efficient production is largely responsible for the fact that in Osborn Moulding Machines the foundrymen of America are able to get advanced design, precision manufacture and high performance.

Years of planning and improving production methods make it possible today to maintain Osborn's standards of quality and service, and still meet the unprecedented production requirements of America's vast war program.

* * *

THE OSBORN MANUFACTURING COMPANY
5401 Hamilton Avenue *Cleveland, Ohio*

OSBORN

MOULDING MACHINES

BRITISH FOUNDRYMEN GATHER IN LONDON FOR ANNUAL MEETING AND CONFERENCE

By VINCENT DELPORT

European Manager, The Foundry

THE thirty-ninth annual general meeting and convention of the Institute of British Foundrymen, was held at the Waldorf Hotel, London, with Maj. R. Miles, managing director of Head Wrightson & Co. Ltd., in the chair. Owing to war conditions the proceedings were strictly business-like and lasted throughout the day of Saturday, June 20. Attendance, however, was comparable in size to that of the conventions that were held in previous years.

Proceedings opened with the annual general meeting of, the members of the institute. The secretary presented the report and mentioned the fact that membership of the institute had increased by nearly 100, the total number at April 30, 1942, reaching the record figure of 2407 as compared with 2317 at April 30, 1941. It is a tribute to the institute and to the industry that, despite difficulties arising out of the war, activities of the institute were well-maintained during the year, and that new members are joining in a more or less constant stream. This was emphasized by the report of the technical committee which has played a large part in the development of the production of castings for war purposes.

Following presentation of the annual report, the president announced the awards of medals.

The Oliver Stubbs Gold Medal was awarded to S. H. Russell, past president and honorary secretary of the institute, managing director of S. Russell & Sons, Ltd., in acknowledgment of the educational work which he has undertaken for many years as chairman of the City and Guilds of London Institute Advisory committee; the contributions which he has made to the discussions on papers at branch meetings; his work as honorary treasurer of the institute, and his chairmanship of the organization committee responsible for drafting the proposed new rules.

The E. J. Fox Gold Medal was awarded to P. H. Wilson, assistant managing director (technical), the Stanton Ironworks Co. Ltd., for his work in development of the centrifugal casting process for the production of cast iron pipe. The presentation to Mr. Wilson was made by the donor of the medal, who is about to retire from the managing directorship of the Stanton Ironworks Co. Ltd.

Service Is Recognized

The Meritorious Services Medal was awarded to S. W. Wise, honorary treasurer of the West Riding of Yorkshire Branch of the institute, in recognition of the considerable service which he has rendered to the institute during 30 years of membership. Mr. Wise has been registrar of the Newcastle branch and a vice president of that branch; he was an examiner for the John Surtees memorial examinations, and for the past 16 years has been honorary secretary of the West Riding of Yorkshire Branch.

Diplomas of the institute were also awarded to A. B. Bill, of the East Midland Branch, for his paper on "Control in a Repetition Foundry", read before the Lancashire Branch; to F. G. Butters, of the East Midland Branch, for his paper on "Pattern Equipment for Quantity Production of Small and Medium Castings", read before his branch; to E. J. Kelly, of the Wales and Monmouth Branch, for his paper on "Moulding Problems in the Electric Steel Foundry", read before his branch; and to J. G. Pearce, director of British Cast Iron Research Association and a member of the Birmingham branch, for his paper on "Specifications for Cast Iron", presented to the annual general meeting 1941.

Election of officers for the year 1942-43 followed. Maj. R. Miles was re-elected president for a second year of office and his election was received with acclamation. D. H. Wood, managing director of Constructional Engineering Co. Ltd., was re-elected as senior vice president, and Daniel Sharpe, director of Foundry Plant and Machinery, Ltd., was elected junior vice president. Mr. Sharpe's election was notable in view of the fact that he is a leading member of the Scottish branch of the institute.

The president then delivered a short address in which he continued in some measure the discursive remarks he made at the previous year's conference, and the greater portion of his address was devoted to suggestions for lessening the economic difficulties that will concern the country in the immediate post-war period. He said that the situation would entail planning ahead in some detail and he confirmed his

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DANIEL SHARPE, newly-elected junior vice-president of the Institute of British Foundrymen, received his early education in various Glasgow schools, and Royal Technical College, Glasgow. He gained his practical metallurgical training in the Steel Company of Scotland, Ltd., where he spent six years, four in the laboratory of Blochairn Works, Glasgow, and two years as melter and sample passer on the open-hearth furnace bench. Mr. Sharpe then became chemist and assistant foundry manager with the Acme Steel & Foundry Co., Ltd., Shettleston, with whom he remained about two years when he returned to the Steel Company of Scotland to become steel foundry manager at the Hallside Works, Newton. Later Mr. Sharpe was appointed manager of the National Steel Foundry Co., Ltd., Leven, Fife, afterwards becoming a director of the company.

Daniel Sharpe

In 1920 Mr. Sharpe went to the United States where he spent more than a year visiting over 100 iron and steel foundries. He now is associated with Walter Macfarlane & Co., Ltd., Saracen Foundry, Possilpark, Glasgow, and a number of other firms. He also is chairman of Sugar Machinery Association, and of Sugar Machinery Export Group, and chairman of Glasgow Chamber of Commerce (Engineering Section).

Daniel Sharpe is a past president of the Scottish branch of the Institute of British Foundrymen and has been on the council of the Institute for several years.

opinion that industry and trade will have to submit to a considerable degree of control for some time after hostilities are over.

He said that fundamentally one must assume a reasonable standard of living for every citizen of the country. The social organization today is such that the individual is very rarely able to be self-sufficient, hence the predominating way of earning a living is to produce goods or services which can be exchanged. Under a system of "laissez-faire", employment was determined by its efficiency and usefulness, provided capital was available.

This arrangement was sound in that it corresponded with the natural arrangement of the survival of the fittest, and to interfere with it seemed like abrogating the natural order and putting reason in its place. But man's reason is expanded continually, and the president gave it as his opinion that the stage had been reached where reason should be able to exercise considerable control of man's economical satisfaction. It is a matter of organization or, in other words, of "planning" and "control".

The president went on to say that the country's capital represented by savings and stocks of goods will be depleted very greatly by the war. Hence the reasonable standard of life must be earned currently. The difficulty lies in the organization of production and its distribution to the points of consumption. Major Miles stated that a plan, starting from the bottom with the employment of individuals, will soon become too complicated to complete, but it is possible that a fundamental plan could be worked out for major articles of consumption to obtain a rough volume of consumption per annum.

It could be done by assuming a certain standard of living, of say a national group, converting that standard into pounds of this and yards of that, that each person requires each year to maintain the assumed standard. Calculations referring to major necessaries would be simplified by taking the minimum quantities of each required to maintain the standard laid down. Having obtained the volume per individual this should be multiplied by the number of individuals in the national group and the result would give the requirements of the group. All the national group totals would then be added together and this would give the grand total of consumption.

Allocate Required Production

The president believed it to be a fact that the grand total of production could exceed the grand total of consumption, hence the next step would be to allocate the required production, distributing the effort as nearly as possible pro rata to the consumption, not only to keep everything as fair as possible, but to reduce the transference of other means of exchange to a minimum. Incidentally, instead of a "dole", nontransferable coupons or "points" rationing could be instituted for those whose labor could not be immediately absorbed in the main plan.

There would probably remain a large balance of unexpended effort, which could be applied with considerably less control, in the first place, to less necessary consumption goods, in the second place to public works or other capital goods, and in the third place to luxuries.

The president emphasized, however, that the primary absorption of manpower after the war must be in the production of consumption goods. He also stressed the fact that there is no ready solution to post-war problems "just round the corner". In a reference to the so-called capitalistic system, he said that whether the state or the private individual controls the use of capital is of secondary importance. Inevitably modern production methods demand units of increasing size, and frequently only the state can supply the necessary capital even now, but whether capital is employed by the state or by the individual, there must be some return on the whole if material progress is to be made.

Major Miles ended by saying—"I believe that the transitional difficulties that I have implied will not impair my main theory of working to an approximate calculation of the minimum major needs, at any rate among those national groups who will 'play'. I would repeat that complete solutions will almost certainly never be within our immediate grasp, but we must all work with goodwill—I emphasize goodwill—and even do a bit of wishful think-

(*Concluded on page* 125)

S. H. RUSSELL who was awarded the Oliver Stubbs gold medal by the I.B.F. was born in 1886, and since leaving school has been associated with the ironfounding firm of S. Russell & Sons Ltd. which was started by his grandfather in 1864. He has been a member of the Institute since 1906, and was president in 1928. Mr. Russell is

S. H. Russell

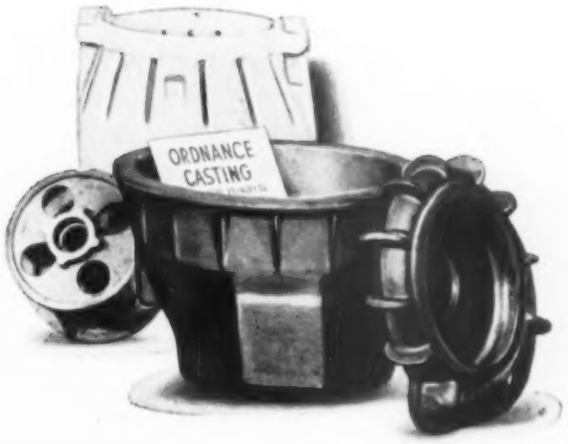
chairman of the organization committee of the institute, a member of the development committee and of the education committee. He is chairman of the advisory committee on examination in foundry practice and patternmaking of the City and Guilds of London Institute, and represents the I.B.F. on the board of governors of Loughborough (Technical) College. He has been a member of the council and of the research committee of the British Cast Iron Research Association since its formation, and is a representative of the National Ironfounding Employers' Federation on the Council of Ironfoundry Associations.

P. H. WILSON, who was awarded the E. J. Fox medal by the I.B.F. served his apprenticeship with the Whessoe Foundry Co., Darlington, and with Messrs. Markham & Company, Ltd. Broad Oak Works, Chesterfield. After

P. H. Wilson

spending a short period at Widnes Foundry, Widnes, in connection with the Vyrnwy Water Scheme, for the Liverpool corporation, he was employed for eight years by Messrs. James Oakes & Co., Alfreton Ironworks, as works superintendent. In 1911, he was appointed foundry manager and engineer of The Staveley Coal & Iron Co., Ltd., near Chesterfield, which position he held for eight years. He resigned his post in June, 1919, to take up the position of foundry general manager with The Stanton Ironworks Co., Ltd., and was appointed assistant managing director (technical) of this company in June 1940. Mr. Wilson is a member of the Institute of Mechanical Engineers, having joined as a graduate in 1905.

KEEP 'EM CASTING WITH PERFECT CORES



The Penolyn Core Oil exhibit seen at the recent Foundrymen's Association Convention in Cleveland.

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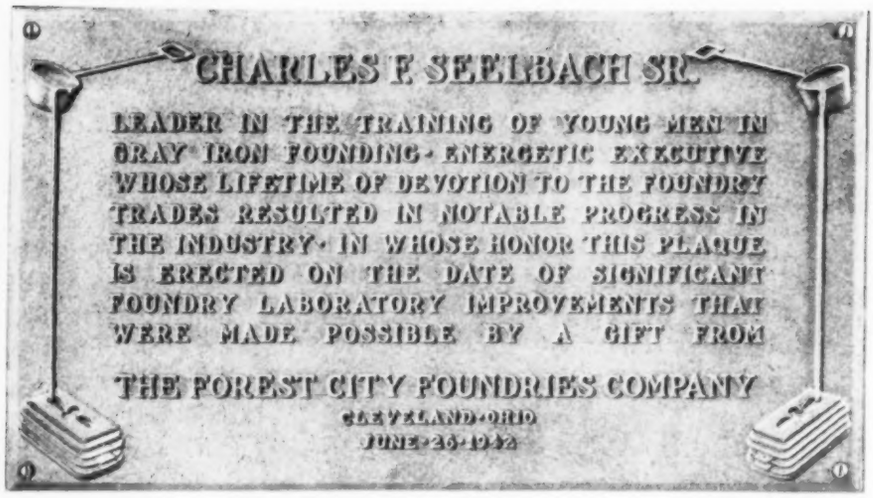

CHARLES F SEELBACH SR
LEADER IN THE TRAINING OF YOUNG MEN IN GRAY IRON FOUNDING · ENERGETIC EXECUTIVE WHOSE LIFETIME OF DEVOTION TO THE FOUNDRY TRADES RESULTED IN NOTABLE PROGRESS IN THE INDUSTRY · IN WHOSE HONOR THIS PLAQUE IS ERECTED ON THE DATE OF SIGNIFICANT FOUNDRY LABORATORY IMPROVEMENTS THAT WERE MADE POSSIBLE BY A GIFT FROM
THE FOREST CITY FOUNDRIES COMPANY
CLEVELAND · OHIO
JUNE · 26 · 1942

Gifts Permit Case School To Extend Foundry Facilities

THROUGH a generous gift of funds made in honor of the late Charles F. Seelbach Sr., one of the founders of the Forest City Foundries Co., Cleveland, the Case School of Applied Science, Cleveland, has been able to build a new sand testing laboratory, install many new pieces of apparatus and rebuild and renovize much of the existing equipment in the laboratory and foundry, located in the southwest wing of the Bingham Building, which is devoted to the department of Mechanical Engineering. In addition to these funds, the company also has provided that memberships in the American Foundrymen's Association be given yearly to the professor in charge of the foundry and to his two assistants. G. B. Carson, associate professor of Industrial Engineering, is in charge of the foundry and laboratory, and F. E. Smith, instructor in Industrial Engineering and E. J. R. Hudec, demonstrator in Industrial Engineering are the assistants.

The gift, which will permit Case to give its engineering students a more thorough background in the principles of foundry practice, and detailed information on the application of castings in engineering design, was made jointly by the Forest City Foundries Co., and several members of that firm. These include a son of the late Mr. Seelbach, Charles Seelbach, vice president and general manager of the company; a daughter, Mrs. Mabel Krebs; P. J. Strangward, chairman of the board and Walter L. Seelbach, secretary and treasurer. To record this gift, a plaque, shown in the accompanying illustration, was cast in gray iron at one of the Forest City plants and will be mounted in the Case foundry department.

The new sand testing laboratory, which also will be used in sand research, has been constructed on the charging floor level. It is glass enclosed and dust proof, and has been provided with complete fixtures of the latest design. The list of improvements and extensions provided by the Charles F. Seelbach funds are as follows: Construction of the foundry control laboratory; concrete pedestals for sand specimen and core specimen rammers; rebuilding of permeability testing machine; motor drive for compression testing machine, core tension testing attachments for compression testing machine; core rammer for tension specimens, resilience and deformation attachment for compression testing, sensitive balance; set of calibrated weights; laboratory balance; mold hardness tester; rapid moisture teller; rapid clay washing machine; coremaking and testing bench and cabinet; core oven temperature and circulation controls; repairs to electric specimen drying oven; two interval timers; rebuilding high temperature pyrometer; low temperature pyrometer; complete set of laboratory thermometers; construction of laboratory size muller; high temperature gas fired tilting crucible furnace; centrifugal blower and duct work; repairs to 28-inch cupola; flask equipment; complete equipment for chemical analysis of gray iron for the following elements: a) carbon, b) sulphur, c) nickel, (other elements may be added later); chemical analysis bench with cabinet for apparatus; new sieve shaker; chill test equipment; fluidity test equipment; improvements to sandblasting equipment; improvements to dust collection duct work; improvements to sand handling and conditioning equipment; improvements to air measuring equipment for cupola and crucible furnaces.

In addition to these gifts, L. A. Eiben, general manager, Northern Blower Co., Cleveland, and an alumnus of Case, has presented the foundry department with a complete dust collecting unit.

Formula for Pricing Gray Cast Iron

Producers of gray iron castings were given a formula by the OPA recently for determining the maximum price for any gray iron casting produced for which the maximum price cannot be determined under Section 1499.2 of the General Maximum Price Regulation.

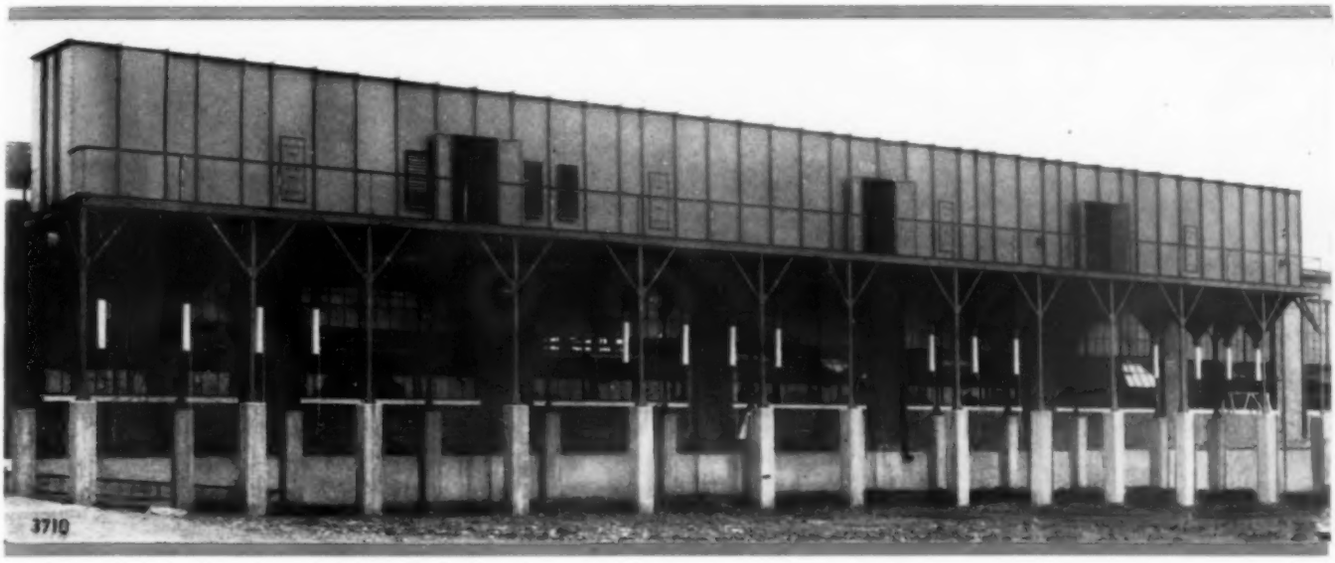
Price Administrator Leon Henderson pointed out that there are more than 3000 producers of gray iron castings, and that their products are not at all uniform. Castings for the most part, are custom made to fit particular designs and specifications.

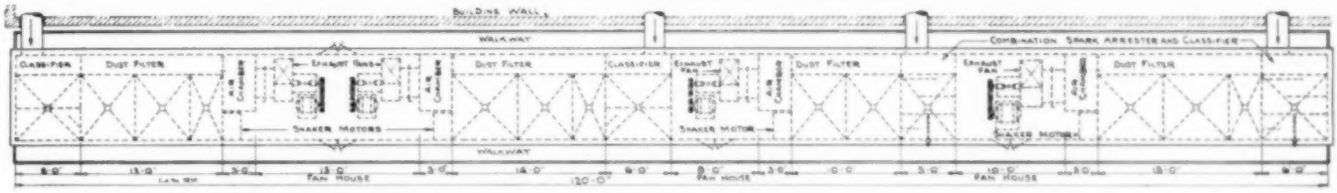
"If sellers were required to apply to the Office of Price Administration in each instance for authorization to determine a maximum price, the burden on OPA would be great," he declared. "Moreover, a great many gray iron castings are used directly for war armaments, and delays in the determination of maximum prices might hamper the war effort."

In Order No. 1 under Section 1499.3 (b) of the GMPR, effective May 25—the Price Administrator gave this formula for pricing gray iron castings whose prices cannot be determined under Section 1499.2:

"The Producer's maximum price for each such casting shall be a net price (after adjustment for all applicable customary extra charges, discounts or other allowances) not in excess of that at which he would have sold such a casting during March, 1942, under the pricing formula or method of calculating price used by him in March, 1942, employing the same cost factors (wage rates, prices of materials and overhead) and profit margins which were in effect for him in March, 1942, even though his costs or profit margins may have increased since that date."

The Price Administrator added that on or before the last day of each month, beginning with June 30, 1942, a seller must report the prices of all gray iron castings priced under Section 1499.3 (b) during the preceding month to OPA in Washington on forms which are to be supplied. Each price so reported shall be subject to adjustment at any time by the OPA.





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End view of Sly Dust Filter with standard supports mounted on concrete piers, for truck passage under dust hoppers.

*This Sly Dust Collector consists of four dust filters, two classifiers, two combination spark arresters and classifiers, and three fan houses, as shown in the sketch. It does a thorough job of exhausting all dust created by cleaning and polishing operations.

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EMERGENCY ALTERNATE PROVISIONS ON CASTINGS SPECIFICATIONS ISSUED

TO BRING certain requirements in steel castings specifications in line with other specifications, particularly federal specification QQ-S-681b and proposed Navy specifications, and to aid in production the American Society for Testing Materials has issued a number of emergency alternate provisions relating to steel castings. Also to conserve tin and use of new copper, and permit use of scrap similar provisions have been issued relating to nonferrous castings. The various emergency alternate provisions follow:

EA-A 27

Issued, February 24, 1942

The following Emergency Alternate Provisions, when specified, may be used as alternates in A.S.T.M. Standard Specifications for Carbon-Steel Castings for Miscellaneous Industrial Uses (A 27-39) and affect only the requirements referred to:

Section 3 (*d*).—Change the last sentence to read as follows:

No casting so treated shall be removed from the furnace until the pyrometer indicates that the entire furnace charge has fallen to a *temperature of* 750 *Fahr.* (399 *Cent.*), *or lower, unless otherwise specified by the purchaser.*

Section 5.—Delete the requirement for maximum manganese permitted

Section 8 (*a*).—Add the following as footnote "b" to Table I, applying to grades A-3, B-1, B-2, and H-1:

†Unless full annealing is specifically requested in the inquiry, contract, or order, castings made in grades A-3, B-1, B-2, and H-1 may be given a normalize treatment followed by a draw treatment instead of the full anneal treatment.

Table I.—Change the minimum physical requirements for grade B-2 to the following:

	Tensile Strength, min., psi.	Yield Point, min., psi.	Elongation in 2 in., min., per cent	Reduction of Area, min., per cent
Grade B-2	65,000	35,000	20	30

EA-A 87

Issued, February 24, 1942

The following Emergency Alternate Provisions, when specified, may be used as alternates in A.S.T.M. Standard Specifications for Carbon-Steel and Alloy-Steel Castings for Railroads (A 87-36) and affect only the requirements referred to:

Section 3 (*d*).—Change the last sentence to read as follows:

No casting so treated shall be removed from the furnace until the pyrometer indicates that the entire furnace charge has fallen to a *temperature of* 750 *Fahr.* (399 *Cent.*), *or lower, unless otherwise specified by the purchaser.*

Section 9 (*a*).—Change the first sentence to read as follows:

One or more test coupons sufficient in size and number to provide the required test specimens shall be cast attached near the end of each locomotive frame, to each locomotive cylinder, to each wheel center, and to each other casting, *where practicable, weighing over* 500 *lb. each*, except as otherwise specially provided for in these specifications.

Also in Section 9 (*a*) change the last sentence to read as follows:

In the case of orders for castings weighing under 500 *lb. each*, the physical properties required in Table I shall be determined from an extra or spare test coupon cast attached to another casting from the same melt.

EA-A 148

Issued, February 24, 1942

The following Emergency Alternate Provisions, when specified, may be used as alternates in A.S.T.M. Standard Specifications for Alloy-Steel Castings for Structural Purposes (A 148-36) and affect only the requirements referred to:

Section 1.—Change the reference to Class C to read as follows:

Class C.—Castings of *four grades*, which may be liquid quenched and tempered or drawn (Note 3).

Table I.—Add the following minimum physical requirements for a new grade 4 of Class C castings:

	Tensile Strength, min., psi.	Yield Point, min., psi.	Elongation in 2 in., min., per cent	Reduction of Area, min., per cent
Class C, Grade 4	105,000	85,000	18	40

EA-A 215

Issued, February 24, 1942

The following Emergency Alternate Provisions, when specified, may be used as alternates in A.S.T.M. Standard Specifications for Carbon-Steel Castings Suitable for Fusion Welding for Miscellaneous Industrial Uses (A 215-41) and affect only the requirements referred to:

Section 1 (*b*).—Change to read as follows:

(*b*) *Five grades* are covered, as indicated below, the grade desired to be specified by the purchaser:

Grade EN-1-W not required to be physically tested, nor to be heat-treated except as conditionally provided for in Section 13 (*b*).

Grade EN-2-W not required to be physically tested, but required to be full annealed, normalized, or normalized and drawn.

Grade EA-1-W required to be physically tested, but not required to be heat-treated except as conditionally provided for in Section 13 (*b*).

Grade EA-2 W required to be full annealed, normalized, or normalized and drawn and to be physically tested.

Grade EB-W required to be full annealed, normalized, or normalized and drawn and to be physically tested.

Section 3 (*a*).—Change to read as follows:

3. (*a*) A heat treatment (Note 3), either by full annealing, normalizing, or normalizing and drawing at the option of the manufacturer, shall be applied to all castings of grades EN-2-W, EA-2-W, and EB-W. Castings of welding quality shall not be cooled from above the critical range by liquid quenching, liquid spraying, or air blasting. Unless otherwise specified, all castings may be annealed one or more times and may be given a supplementary heat treatment by temperating or drawing.

Section 3 (*d*).—Change the last sentence to read as follows:

No casting so treated shall be removed from the furnace until the pyrometer indicates that the entire furnace charge has fallen to a *temperature of* 750

Fahr. (399 Cent.), or lower, unless otherwise specified by the purchaser.

Section 5.—Change to read as follows:

5. The steel shall conform to the requirements as to chemical composition prescribed in Table I.

Table I.—Chemical Requirements

	Carbon, max.,* per cent	Manganese, max.,* per cent	Phosphorus, max., per cent	Sulphur max., per cent	Silicon, max., per cent
Grade EN-1-W	0.25	0.75	0.05	0.06	0.60
Grade EN-2-W	0.35	0.60	0.05	0.06	0.60
Grade EA-1-W	0.25	0.75	0.05	0.06	0.60
Grade EA-2-W	0.30	0.60	0.05	0.06	0.60
Grade EB-W	0.35	0.60	0.05	0.06	0.60

*For each reduction of 0.01 per cent below the maximum specified carbon content, an increase of 0.04 per cent manganese above the specified maximum will be permitted up to a maximum as follows:

	Manganese, max., per cent
Grades EN-1-W, EA-1-W, EA-2-W	1.10
Grades EN-2-W, EB-W	1.00

Table II.—Change to read as follows:

Table II.—Tensile Requirements

	Tensile Strength, min., psi.	Yield Point, min., psi.	Elongation in 2 in., min., per cent	Reduction of Area, min., per cent
Grade EA-1-W, unannealed	60,000	30,000	22	30
Grade EA-2-W, heat treated	60,000	30,000	24	35
Grade EB-W, heat treated	65,000	35,000	20	30

EA-A 216
Issued, April 6, 1942

The following Emergency Alternate Provisions, when specified, may be used as alternates in A.S.T.M. Tentative Specifications for Carbon-Steel Castings Suitable for Fusion Welding for Service at Temperatures up to 850 Fahr. (A 216-41 T) and affect only the requirements referred to:

Section 1 (*b*).—Add two new grades of carbon-steel castings suitable for welding for applications as pressure containing turbine castings, as follows:

Grade EWCC—Grade EWCD

Section 5.—Add to Paragraph (*a*) the following requirements as to chemical composition for Grades EWCC and EWCD.

Grades:	EWCC	EWCD
Carbon, max., per cent	0.30*	0.35*
Manganese, max., per cent	0.60*	0.70*
Phosphorus, max., per cent	0.05	0.05
Sulphur, max., per cent	0.06	0.06
Silicon, max., per cent	0.60	0.60

*For each reduction of 0.01 per cent below the specified maximum carbon content, an increase of 0.04 per cent manganese above the specified maximum will be permitted up to a maximum of 1.00 per cent.

Add in Paragraph (b) the symbols "EWCC" and "EWCD" to the heading of the table, since the requirements of this section apply to the two new grades.

Section 8 (*a*).—Add the following requirements for grades EWCC and EWCD:

Grades:	EWCC	EWCD
Tensile strength, min., psi	60,000	65,000
Yield point, min., psi	30,000	35,000
Elongation in 2 in., min., per cent	24	20
Reduction of area, min., per cent	35	30

Section 10 (*a*).—Add the symbols "EWCC" and "EWCD," since the requirements of this section apply to the two new grades.

Section 16 (*a*).—Add the symbols "EWCC" and "EWCD", since the requirements of this section apply to the two new grades.

EA-A 217
Issued, April 6, 1942

The following Emergency Alternate Provisions, when specified, may be used as alternates in A.S.T.M. Tentative Specifications for Alloy-Steel Castings Suitable for Fusion Welding at Temperatures from 750 to 1100 Fahr. (A217-41T) and affect only the requirements referred to:

Section 1 (*b*).—Add one new grade of alloy-steel castings suitable for welding for pressure containing turbine castings, as follows:

Grade EWC5

Section 5.—Add to Paragraph (*a*) the following requirements as to chemical composition for Grade EWC5:

	Grade EWC5
Carbon, max., per cent	0.30*
Manganese, max., per cent	0.70*
Phosphorus, max., per cent	0.05
Sulphur, max., per cent	0.06
Silicon, max., per cent	0.60
Nickel, per cent	....
Chromium, per cent	....
Molybdenum, per cent	0.40 to 0.60

*For each reduction of 0.01 per cent below the specified maximum carbon content, an increase of 0.04 per cent manganese above the specified maximum will be permitted up to a maximum of 1.00 per cent.

Add to Paragraph (*b*) the following requirements for grade EWC5:

	Grade EWC5
Copper, max., per cent	0.50
Nickel, max., per cent	0.50
Chromium, max., per cent	0.25
Tungsten, max., per cent	0.10
Total content of these unspecified elements, max., per cent	1.0

Section 8 (*a*).—Add the following requirements for grade EWC5:

	Grade EWC5
Tensile strength, min., psi	65,000
Yield point, min., psi	35,000
Elongation in 2 in., min., per cent	20
Reduction of area, min., per cent	30

Section 17 (*a*).—Add the symbol "EWC5," since the requirements of this section apply to the new grade.

EA-B 144
Issued May 26, 1942

The following Emergency Alternate Provisions, when specified, may be used as alternates in A.S.T.M. Tentative Specifications for High-Leaded Tin-Bronze Sand Castings (B144-41T), and affect only the requirements referred to:

Tables II and III.—Alloy 3B is recommended as an alternate or substitute for alloy 3A.

Alloys 3X and 3Y conforming to the requirements as to chemical composition and tensile properties prescribed in the accompanying Table I may be used as a substitute for alloy 3A.

Alloy 3Z conforming to the requirements as to chemical composition and tensile properties prescribed in the accompanying Table I may be used as a substitute for alloy 3D.

Alloy 3W conforming to the requirements as to chemical composition and tensile properties prescribed in the accompanying Table I may be used as a substitute for alloy 3E.

Table I.—Chemical and Tensile Requirements.

	Alloy 3X	Alloy 3Y	Alloy 3Z	Alloy 3W
Nominal Composition	80-7-10-3	84-8-8-0	78-6-15-1	70-5-25-0
Chemical Requirements:				
Copper, %	77.00 to 81.00	82.00 to 85.00	75.00 to 79.00	67.00 to 71.00
Tin, %	6.00 to 7.50	7.00 to 9.00	5.50 to 7.00	4.00 to 5.50
Lead, %	8.00 to 11.00	7.00 to 9.00	13.00 to 16.00	23.00 to 27.00
Zinc, %	2.00 to 4.00	0.75 max.	1.25 max.	0.75 max.
Nickel, max., %	0.50	1.00	0.75	1.00
Iron, max., %	0.20	0.15	0.15	0.15
Antimony, max., %	0.75	....	0.75	0.75
Aluminum, %	none*	none*	none*	none*
Silicon, max., %	0.003	0.003	0.003	0.003
Phosphorus, %	0.05 max.	0.20 to 0.50	0.08 max.	0.05 max.
Total other elements, max., %	0.35	0.50	0.35	0.35
Tensile Requirements:				
Tensile strength, min., psi	25,000	25,000	25,000	21,000
Yield strength,† min., psi	12,000	12,000	14,000	11,000
Elong. in 2 in., min., %	8	8	10	7

*The term "none" as applied to aluminum allowance is defined as 0.005 per cent when determined on a 10-g. sample.

†Yield strength shall be determined as the stress producing an elongation under load of 0.5 per cent, that is, 0.01 in. in a gage length of 2 in.

Explanatory Note

Note.—Attention is called to the Emergency Alternate Provisions EA-B 30 in the Tentative Specifications for Copper-Base Alloys in Ingot Form for Sand Castings (B 30-41 T) which provide detailed chemical requirements for alternate copper-base alloys in ingot form for these castings.

(*Continued on page* 100)

The CORE OIL DOCTOR

Devoted to new ideas and case study reports on core room practice

Published Monthly, Volume 1, Number 5, August 1942

Can We Help You With Your Core Room Problems?

Many foundries on war production have solicited our cooperation and the gratis service of our testing laboratory to speed-up core production, reduce core breakage, cleaning cost, and the costs of core production in general. We have gladly helped them and offer the same service to you. Our testing laboratory is equipped with the most modern devices for making chemical and physical determinations.

Our modern 350,000 gallon plant is equipped with the latest types of weighing, cooking, mixing, blending, storage and pumping equipment. Complete stocks of finished core oil are on hand in eleven industrial centers (see list below) to assure prompt delivery. We want to help you in every way possible in your war production efforts — with dependable core oils and gratis core testing laboratory service—write or wire today!

Questions and Answers

Question: What grade of core oil, sand and other materials will give most economical and satisfactory results on core blowing machines? Also please give us suggested mixtures.

Answer: Suggested ingredients and mixtures were sent you by mail, but as your question is an important one we answer it here in a general way for the benefit of other core blowing machine users.

Different mixes are necessary for different types of cores, the type of sand employed and whether or not driers are used. However, the following established practices should be adhered to as closely as possible:

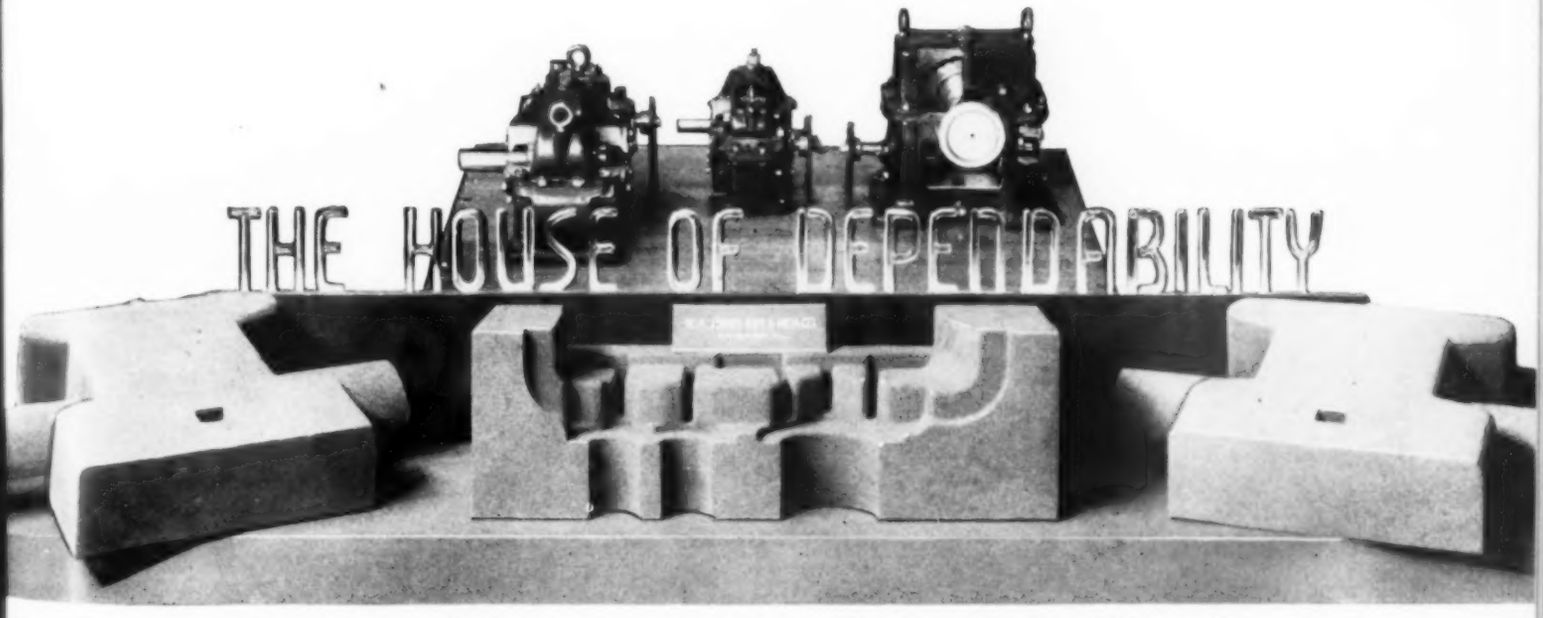
Sharp sand is preferable although some bank sand may be used if it is economical to do so.

A core oil with a reasonably high percentage of kerosene in its formula gives best results because it allows for the use of only a minimum amount of water in the mix and this is absolutely essential for successful core blowing.

Use only a minimum amount of any well known cereal binder to give the necessary green bond and we emphasize ONLY SUFFICIENT WATER TO BRING OUT THE COLLOIDAL PROPERTIES OF THE CEREAL BINDER. TOO MUCH WATER BRINGS NEGATIVE RESULTS.

Without any obligation whatsoever, we will gladly furnish established mixes to any foundry on receipt of information covering the type of cores being blown, whether or not driers are used, the type or types of sand used, the average mesh and clay content thereof and what cereal binder is employed.

Mr. Core Room Foreman: If you are having difficulties with your core production, let us help you. Send us 4 oz. of your core oil, 5 pounds of core sand, your oil-to-sand ratio, other binder and baking details. We'll give you test details and suggested changes in practice as indicated.



A group of large speed reducer housing cores made with "The Dependable Core Oil." In background are shown cutaway models of this user's spur gear, herringbone gear and worm gear speed reducers.

CERTIFIED CORE OIL & MFG. CO.

"The House of Dependability"

3308-26 South Cicero Avenue, Cicero, Illinois

Stock and Representatives: Buffalo, N. Y. Elmira, N. Y. Worcester, Mass. Reading, Pa. Newark, N. J. St. Louis, Mo. New Orleans, La. Houston, Tex. Chattanooga, Tenn. Minneapolis, Minn.

(*Continued from page* 98)

EA-B 30
Issued May 26, 1942

The following Emergency Alternate Provisions, when specified, may be used as alternates in A.S.T.M. Tentative Specifications for Copper-Base Alloys in Ingot Form for Sand Castings (B30-41T) and affect only the requirements referred to:

Table II.—Add the chemical composition requirements for alternate alloys 2X, 2Y, 2Z, 3X, 3Y, 3Z, 3W, 5X, 6X, and 6Y, as prescribed in the accompanying table shown at the bottom of this page.

Explanatory Note

Note.—In connection with these emergency alternate copper-alloy ingots, attention is called to alternate brass and bronze castings covered in the following emergency alternate provisions in A.S.T.M. specifications for copper-alloy castings:

Designation	Emergency Alternate Provisions in	Emergency Alternate Alloys
EA-B 60	Standard Specifications for Castings of the Alloy: Copper 88 per cent, Tin 8 per cent, Zinc 4 per cent (B60-41)	2X, 2Y, 2Z
EA-B 62	Standard Specifications for Composition Brass or Ounce Metal Castings (B62-41)	5X
EA-B 143	Tentative Specifications for Tin-Bronze and Leaded Tin-Bronze Sand Castings (B143-41T)	2X, 2Y, 2Z
EA-B 144	Tentative Specifications for High-Leaded Tin-Bronze Sand Castings (B144-41T)	3X, 3Y, 3Z, 3W
EA-B 145	Tentative Specifications for Leaded Red Brass and Leaded Semi Red Brass Sand Castings (B145-41T)	5X
EA-B 146	Tentative Specifications for Leaded Yellow Brass Castings for General Purposes (B146-41T)	6X, 6Y

EA-B 143
Issued May 26, 1942

The following Emergency Alternate Provisions, when specified, may be used as alternates in A.S.T.M. Tentative Specifications for Tin-Bronze and Leaded Tin-Bronze Sand Castings (B143-41T), and affect only the requirements referred to:

Tables II and III.—Alloy 2A may be used as a substitute for alloys 1A and 1B, in the case of castings for pressure parts.

In the case of castings for pressure parts, the Standard Specifications for Steam or Valve Bronze Castings (A.S.T.M. Designation: B61) of the American Society for Testing Materials may be used as a substitute for alloys for 1A and 1B.

Alloys 2X and 2Y conforming to the requirements as to chemical composition and tensile properties prescribed in the accompanying Table I may be used as substitutes for alloys 1A and 1B in the case of castings for bearings and structural parts.

Alloy 2X may be used as a substitute for alloy 2B.

Alloy 2Z conforming to the requirements as to chemical composition and tensile properties prescribed in the accompanying Table I may be used as a substitute for alloy 1B, in the case of castings for bearings and structural parts.

Table I.—Chemical and Tensile Requirements

	Alloy 2X*	Alloy 2Y†	Alloy 2Z‡
Nominal Composition	87-8-1-4	88-8-0-4	86½-8-1½-4
Chemical Requirements:			
Copper, per cent	86.00 to 89.00	86.00 to 89.00	85.00 to 88.00
Tin, per cent	7.50 to 9.00	7.50 to 11.00	7.50 to 9.00
Lead, per cent	1.00 max.	0.60 max.	1.00 to 2.50
Zinc, per cent	3.00 to 5.00	1.00 to 5.00	3.00 to 5.00
Nickel, max., per cent	1.00	1.00	1.00
Iron, max., per cent	0.25	0.25	0.25
Aluminum, per cent	none§	none§	none§
Silicon, max., per cent	0.005	0.005	0.005
Phosphorus, max., per cent	0.05	0.02	0.05
Total other constituents, max., per cent	0.35	....	0.35
Tensile Requirements:			
Tensile strength, min., psi.	36,000	40,000	36,000
Yield strength,** min., psi.	16,000	18,000	16,000
Elongation in 2 in., min., per cent	18	20	15

*Alloy 2X is suitable for large bearings and structural parts.

†Alloy 2Y is suitable particularly for small bearings and bushings such as used in internal combustion engines and in torpedo tubes for the U. S. Navy.

‡Alloy 2Z is suitable for bearings and structural parts.

§The term "none" as applied to aluminum allowance is defined as 0.005 per cent when determined on a 10-g. sample.

**Yield strength shall be determined as the stress producing an elongation under load of 0.5 per cent, that is, 0.01 in. in a gage length of 2 in.

Explanatory Note

Note.—Attention is called to the Emergency Alternate Provisions EA-B 30 in the Tentative Specifications for Copper-Base Alloys in Ingot Form for Sand Castings (B 30-41 T) which provide detailed chemical requirements for alternate copper-base alloys in ingot form for these castings.

EA-B 148
Issued May 26, 1942

The following Emergency Alternate Provisions, when specified, may be used as alternates in A.S.T.M. Tentative Specifications for Aluminum-Bronze Sand Castings (B 148-41 T) and affect only the requirements referred to:

Table III.—Change the yield strength values for alloys 9A-1 and 9A-2 from their present form: namely,

	Alloy 9A-1 (As Cast)	Alloy 9A-2 (As Cast)
Yield strength, min., psi	28,000	35,000
to read as follows:		
Yield strength, min., psi	26,000	33,000

EA-B 60
Issued May 26, 1942

The following Emergency Alternate Provisions, when specified, may be used as alternates in A.S.T.M. Standard Specifications for Castings of the Alloy: Copper 88 per cent, Tin 8 per cent, Zinc 4 per cent (B60-41), and affect only the requirements referred to:

Sections 1, 4 *and* 6.—In the case of castings for bearings and structural parts, alloys 2X, 2Y, and 2Z conforming to the requirements as to chemical composition and

(*Concluded on page* 102)

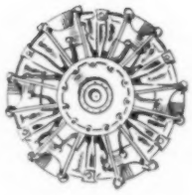
Chemical Composition Requirements for Copper-base Alloys in Ingot Form for Sand Castings EA-B30

Classification	Tin Bronze			High-Leaded Tin Bronze				Leaded Red Brass and Leaded Semi Red Brass	Leaded Yellow Brass	
Numerical Designation of Alternate Compositions	2X	2Y	2Z	3X	3Y	3Z	3W	5X	6X	6Y
Copper, per cent	86.00 to 89.00	86.00 to 89.00	85.00 to 88.00	77.00 to 81.00	82.00 to 85.00	75.00 to 79.00	67.00 to 71.00	78.00 to 82.00	66.00 to 74.00	66.00 to 74.00
Tin, per cent	7.50 to 9.00	7.50 to 11.00	7.50 to 9.00	6.00 to 7.50	7.00 to 9.00	5.50 to 7.00	4.00 to 5.50	2.50 to 3.25	0 to 1.50*	0 to 1.50*
Lead, per cent	0.90 max.	0.50 max.	1.00 to 2.25	8.00 to 11.00	7.00 to 9.00	13.00 to 16.00	23.00 to 27.00	6.00 to 8.00	2.00 to 4.00	2.00 to 4.00
Zinc, per cent	3.00 to 5.00	1.00 to 5.00	3.00 to 5.00	2.00 to 4.00	0.75 max.	1.25	0.75	7.00 to 10.00	remainder	remainder
Nickel, max., per cent	1.00	1.00	1.00	0.50	1.00	0.75	1.00	1.00	1.00*	1.00*
Iron, max., per cent	0.20	0.20	0.25	0.15	0.15	0.15	0.15	0.40	0.60	0.60
Antimony	....	....	....	0.75	....	0.75	0.75	....	....	....
Aluminum, per cent	none†	none†	none‡	none‡	none‡	none†	none†	none†	none†	0.20 to 0.50
Silicon, max., per cent	0.005	0.005	0.005	0.003	0.003	0.003	0.003	0.003	.....	.....
Phosphorus, per cent	0.05 max.	0.02 max.	0.05 max.	0.05 max.	0.20 to 0.50	0.08 max.	0.05 max.	0.02 max.	....	....
Total other constituents, max., per cent	0.35	....	0.35	0.35	0.50	0.35	0.35	0.50	0.35	0.35

*Tin and nickel shall not be intentionally added.

†The term "none" as applied to aluminum allowance is defined as 0.005 per cent when determined on a 10-g. sample.

‡Analysis shall regularly be made only for the elements specifically mentioned in Table II. If the presence of other elements is suspected, or indicated in the course of routine analysis, further analysis shall be made to determine that the total of these other elements is not in excess of the limits specified.



WANTED

50 PRODUCTION EXECUTIVES

Must be top-flight men of proven ability, capable of directing the many divisional operations of one of the world's largest aircraft-engine plants.

The Dodge Chicago Plant, division of Chrysler Corporation, now being built in the Chicago area, wishes to have associated with it a large group of men who have demonstrated their specialized talent, executive ability and high character.

The contract held by Chrysler Corporation for the production of aircraft engines is an outstanding commitment in the war program. It requires doing another high-precision job on a mass-production basis.

This gigantic plant will be one of the world's largest under one roof. Machine tools, equipment and facilities will be the finest and most modern. The personnel must measure up to the same high level of individual efficiency.

This war project demands executive supervision of men, materials and machinery on a scale heretofore unknown in industry. The Dodge Chicago Plant, division of Chrysler Corporation, is determined, therefore, to select as executives men who can guarantee the performance required by patriotic necessity and exacting manufacturing standards.

The Production Executives chosen for this painstaking task must be experts, backed by years of proven skill—both technical and managerial. Thousands of able Americans will work under their direction in round-the-clock shifts. Thousands of precision instruments and production tools will be the responsibility of these top men. That is why they all must be exceptionally good!

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NOTE: *Here is an unusual opportunity for men who are eager to become affiliated with a large organization engaged in the production of vital war materials. Give age, qualifications and salary expected. Proof of citizenship required. All correspondence will be kept confidential. Appointments will be made for personal interviews at your convenience. Address your application to Box 759, care of this paper.*

DODGE CHICAGO PLANT

Division of CHRYSLER CORPORATION

(*Concluded from page* 100)

tensile properties prescribed in the accompanying Table I may be used as substitute for the 88-8-4 alloy.

In the case of castings for pressure parts, the Standard Specifications for Steam or Valve Bronze Castings (A.S.T.M. Designation: B61) or alloy 2A conforming to the Tentative Specifications for Tin-Bronze and Leaded Tin-Bronze Sand Castings (A.S.T.M. Designation: B143) of the American Society for Testing Materials may be used as a substitute for the 88-8-4 alloy.

Table I.—Chemical and Tensile Requirements

	Alloy 2X*	Alloy 2Y†	Alloy 2Z‡
Nominal Composition	87-8-1-4	88-8-0-4	86½-8-1½-4
Chemical Requirements:			
Copper, per cent	86.00 to 89.00	86.00 to 89.00	85.00 to 88.00
Tin, per cent	7.50 to 9.00	7.50 to 11.00	7.50 to 9.00
Lead, per cent	1.00 max.	0.60 max.	1.00 to 2.50
Zinc, per cent	3.00 to 5.00	1.00 to 5.00	3.00 to 5.00
Nickel, max., per cent	1.00	1.00	1.00
Iron, max., per cent	0.25	0.25	0.25
Aluminum, per cent	none§	none§	none§
Silicon, max., per cent	0.005	0.005	0.005
Phosphorus, max., per cent	0.05	0.02	0.05
Total other constituents, max., per cent	0.35	....	0.35
Tensile Requirements:			
Tensile strength, min., psi	36,000	40,000	36,000
Yield strength,** min., psi	16,000	18,000	16,000
Elongation in 2 in., min., per cent	18	20	15

*Alloy 2X is suitable for large bearings and structural parts.

†Alloy 2Y is suitable particularly for small bearings and bushings such as used in internal combustion engines and in torpedo tubes for the U. S. Navy.

‡Alloy 2Z is suitable for bearings and structural parts.

§The term "none" as applied to aluminum allowance is defined as 0.005 per cent when determined on a 10-g. sample.

**Yield strength shall be determined as the stress producing an elongation under load of 0.5 per cent, that is, 0.01 in. in a gage length of 2 in.

Explanatory Note

Note.—Attention is called to the Emergency Alternate Provisions EA-B 30 in the Tentative Specifications for Copper-Base Alloys in Ingot Form for Sand Castings (B 30-41 T) which provide detailed chemical requirements for alternate copper-base alloys in ingot form for these castings.

EA-B 145
Issued May 26, 1942

The following Emergency Alternate Provisions, when specified, may be used as alternates in A.S.T.M. Tentative Specifications for Leaded Red Brass and Leaded Semi Red Brass Sand Castings (B145-41T), and affect only the requirements referred to:

Tables I, II, and III.—Alloy 5X conforming to the following requirements as to chemical composition and tensile properties may be used as a substitute for alloys 4A, 4B, and 5A:

	Alloy 5X
Chemical Requirements:	(81-3-7-9)
Copper, per cent	78.00 to 82.00
Tin, per cent	2.50 to 3.25
Lead, per cent	6.00 to 8.00
Zinc, per cent	7.00 to 10.00
Nickel, max., per cent	1.00
Iron, max., per cent	0.40
Aluminum, per cent	none*
Silicon, max., per cent	0.003
Phosphorus, max., per cent	0.02
Total other constituents, max., per cent	0.50

*The term "none" as applied to aluminum allowance is defined as 0.005 per cent when determined on a 10-g. sample.

Tensile Requirements:	
Tensile strength, min., psi	29,000
Yield strength†, min., psi	13,000
Elongation in 2 in., min., per cent	18

†Yield strength shall be determined as the stress producing an elongation under load of 0.5 per cent, that is, 0.01 in. in a gage length of 2 in.

Explanatory Note

Note.—Attention is called to the Emergency Alternate Provisions EA-B 30 in the Tentative Specifications for Copper-Base Alloys in Ingot Form for Sand Castings (B 30-41 T) which provide detailed chemical requirements for alternate copper-base alloys in ingot form for these castings.

EA-B 62
Issued May 26, 1942

The following Emergency Alternate Provisions, when specified, may be used as alternates in A.S.T.M. Standard Specifications for Composition Brass or Ounce Metal Castings (B62-41), and affect only the requirements referred to:

Sections 4 and 6.—Alloy 5X conforming to the following requirements as to chemical composition and tensile properties may be used as a substiute for the 85-5-5-5 alloy:

	Alloy 5X
Chemical Requirments:	(81-3-7-9)
Copper, per cent	78.00 to 82.00
Tin, per cent	2.50 to 3.25
Lead, per cent	6.00 to 8.00
Zinc, per cent	7.00 to 10.00
Nickel, max., per cent	1.00
Iron, max., per cent	0.40
Aluminum, per cent	none*
Silicon, max., per cent	0.003
Phosphorus, max., per cent	0.02
Total other constituents, max., per cent	0.50

*The term "none" as applied to aluminum allowance is defined as 0.005 per cent when determined on a 10-g. sample.

Tensile Requirements:	
Tensile strength, min., psi	29,000
Yield strength†, min., psi	13,000
Elongation in 2 in., min., per cent	18

†Yield strength shall be determined as the stress producing an elongation under load of 0.5 per cent, that is, 0.01 in. in a gage length of 2 in.

Explanatory Note

Note.—Attention is called to the Emergency Alternate Provisions EA-B 30 in the Tentative Specifications for Copper-Base Alloys in Ingot Form for Sand Castings (B 30-41 T) which provide detailed chemical requirements for alternate copper-base alloys in ingot form for these castings.

EA-B 146
Issued May 26, 1942

The following Emergency Alternate Provisions, when specified, may be used as alternates in A.S.T.M. Tentative Specifications for Leaded Yellow Brass Sand Castings for General Purposes (B146-41T), and affect only the requirements referred to:

Tables I, II, and III.—In the case of castings for pressure parts, alloy 6X conforming to the requirements as to chemical composition and tensile properties prescribed in the accompanying Table I may be used as a substitute for alloys 6A, 6B, and 6C; and in the case of castings for bearings and structural parts, alloy 6Y may be used as a substitute for alloys 6A, 6B, and 6C.

Table I.—Chemical and Tensile Requirements

	Alloy 6X*	Alloy 6Y†
Nominal Composition	70-1-3-26	70-1-3-26
Chemical Requirements:		
Copper, per cent	66.00 to 74.00	66.00 to 74.00
Tin, per cent	0 to 1.50‡	0 to 1.50‡
Lead, per cent	2.00 to 4.00	2.00 to 4.00
Zinc, per cent	remainder	remainder
Nickel, max., per cent	1.00‡	1.00‡
Iron, max., per cent	0.60	0.60
Aluminum, per cent	none§	0.20 to 0.50
Total other constituents, max., per cent	0.35	0.35
Tensile Requirements:		
Tensile strength, min., psi	30,000	30,000
Yield strength,** min., psi	11,000	11,000
Elongation in 2 in., min., per cent	20	20

*Alloy 6X is suitable for castings for pressure parts.

†Alloy 6Y is suitable for castings for bearings and structural parts.

‡Tin and nickel shall not be intentionally added.

§The term "none" as applied to aluminum allowance is defined as 0.005 per cent when determined on a 10-g. sample.

**Yield strength shall be determined as the stress producing an elongation under load of 0.05 per cent, that is, 0.01 in. in a gage length of 2 in.

Explanatory Note

Note.—Attention is called to the Emergency Alternate Provisions EA-B 30 in the Tentative Specifications for Copper-Base Alloys in Ingot Form for Sand Castings (B 30-41 T) which provide detailed chemical requirements for alternate copper-base alloys in ingot form for these castings.

Weld Inspection

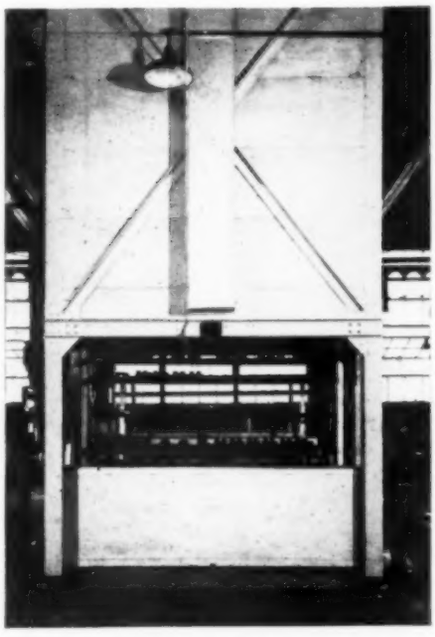
American Welding Society recently has published a 23-page bulletin entitled, "Tentative Recommended Practices for Inspection of Fusion Welding". It represents a comprehensive treatment of the many factors involved in inspection of welds made by the arc and oxy-acetylene processes. Copies of the bulletin are 40 cents each.

Air Reduction Sales Corp., New York, has issued a 54-page booklet on "Welding Procedures" which presents condensed information on various phases of welding including cost factors in choice of process, and procedures for welding various metals and alloys. Copies of the booklet may be secured for 60 cents each.

Modern Equipment Co., Port Washington, Wis., is building an extension to its plant to provide additional space for engineering.

CARL-MAYER CORE OVENS

..FOR A PERFECT SCORE IN WAR PRODUCTION



Typical large Carl-Mayer Vertical Oven as installed for Electric Autolite, Fremont Foundry, Cadillac, General Motors and Packard Motor Co.

VICTORY DEMANDS MARKSMANSHIP both on the front line and in the battle of production.

Carl-Mayer Core Ovens will help you hit the bull's-eye — the fastest stride in the production of war castings . . . . They insure a fast, steady flow of properly baked cores to the molder . . . . Casting rejects due to underbaked or burnt cores become a bugaboo of the past.

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FREMONT FOUNDRY CO.
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GENERAL ELECTRIC CO.
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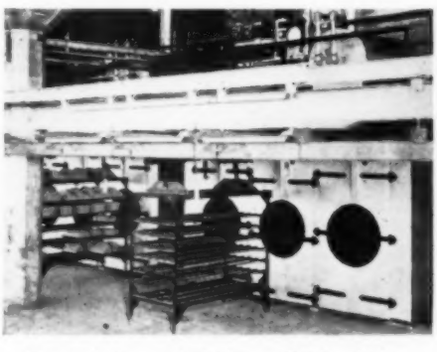
SHENANGO PENN MOLD CO.
STUDEBAKER CORP.
WHITEN MACHINE WORKS
WHITING CORP.



Part of large Carl-Mayer Recirculating Gas Fired Rack Type Oven installation at The General Electric Co.

Three new monorail core ovens similar to this for Ford Motor airplane engine plant.

THE APPROVED CHAPLET

★

FEDERAL TWISTED STEM CHAPLET

★

THE STEM THAT HAS EVERYTHING!

FOUR SHARP EDGES FOR FUSION

TWISTED SQUARE FOR STRENGTH

ABSOLUTELY SMOOTH SURFACE WITH NO DEFORMATIONS TO TRAP GASSES AND CAUSE BLOWS.

PERFECTLY COATED TO PREVENT RUST

SOLIDLY WELDED
ROUND OR SQUARE HEADS

The Twist does the Trick!

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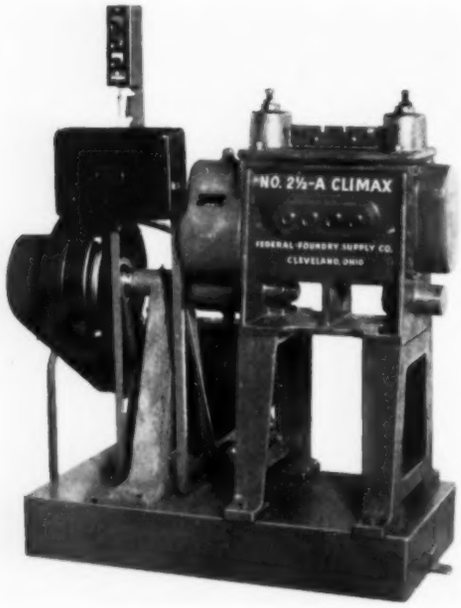

MODEL 2½-A, MOTORIZED

THE CLIMAX CORE WIRE STRAIGHTENER

COMPACT

EFFICIENT

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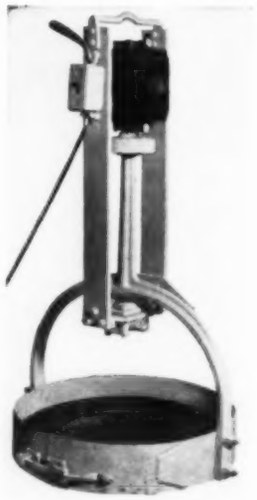

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NEED for gray iron castings for various types of machinery and other government work continues to increase. To speed the war effort through production of these castings in the quantities needed, it is essential that all heavy shops be operated continuously at maximum capacity. Recently the Gray Iron Foundry Society, 1719 K Street, Washington, has been acting as an unofficial clearing house for various inquiries that may come to its attention. This work can be facilitated greatly if ALL gray iron foundries that may be able to take on additional heavy work will notify the society at once, and if firms will continue to keep the society informed wherever such capacity may become available. Complete co-operation in this plan not only will expedite the immediate production of castings, but will conserve strategic materials that will be needed if additional foundry capacity must be built to meet present and future needs.

—□—

During the past month several orders affecting the foundry industry have been issued by WPB and other war agencies.

Changes in order M-61 specify that applicants for crucibles containing Madagascar graphite must use Form PD-575 after Aug. 1, instead of the PD-1A form.

A news release indicating the effect of the new allocation classification system is presented on page 105 of this issue.

According to a recent ruling, if applicants for priority assistance on form PD-1A will enclose a blank self-addressed post card with the application, the case number assigned to the application will be stamped on the card and it will be returned to the applicant to facilitate subsequent inquiries. To avoid unnecessary correspondence, applicants are requested not to make inquiries concerning their cases until two weeks after these could have been received by WPB. From personal experience, I know that this card system would have avoided confusion and much work if it had been in operation in the early days of priorities.

The WPB has published a booklet on "Plant Efficiency" which presents ideas and suggestions on increasing efficiency in smaller plants. While the greater portion of the text is devoted to problems of the machine shop, certain sections, such as those on "Good Lighting—Better Work", "Cutting Down Accidents", "Plant Protection" and "Pooling Facilities", should be of interest to foundrymen.

After the July issue of THE FOUNDRY had gone to press, it was announced that the allocation classification for foundry equipment would be 20.20.

A new and intensified salvage program now is under way under the direction of the Bureau of Industrial Conservation of the WPB. All foundries again should undertake a housecleaning program as a part of this national drive. Foundrymen will be surprised at how much of the salvaged material can be used in their own plant.

Bradley Stoughton, chief, Heat Treating Equipment Unit, WPB, has requested information on all idle heat treating equipment, to assist in meeting a shortage in that field. If you have any such equipment, notify Dean Stoughton at 4520 New Social Security Building, Washington.

Order M-21g, which establishes maximum specifications for alloys in heat resistant steels for various applications are presented on page 130 of this issue.

Foundrymen should check the list of items included in the recently issued Priorities Regulation No. 13. This order sets up new rules for the sale of idle inventories, and includes various items used in the foundry industry.

Office of Defense Transportation recently called for deferment for the duration of all meetings and conventions. Evidently the ODT does not understand the purpose of technical meetings and conventions, and fails to appreciate the value of such gatherings to the war effort. Just as an example, the 1942 annual convention and exhibition of the American Foundrymen's Association in Cleveland undoubtedly was of considerable assistance in speeding production of castings for war, and at the same time aided materially in solving the conversion problem for numerous foundries. Benefits to war work far exceeded the time lost by the men in attendance, and that meeting broke all records for the number of members and guests registered. It would seem there are other events, far less important, but requiring a greater strain on the transportation facilities, both public and private, which are sanctioned by Washington. Just as long as the ODT permits railroads to haul baseball teams around the country for rather abbreviated stands, allows league ball games drawing over a 61,000 gate, and does not stop other sporting events, there should be nothing said about technical meetings and conventions. As a nation, we sometimes exhibit peculiar ideas as to what is essential and what is luxury.

—□—

The July 4 issue of *Business Week*, in listing 13 industries recently identified as "essential" by the War Department, speaks of "iron, steel and *nonporous* foundry products". The italics are mine, and surely indicate that after all these years, the foundry industry has arrived.

—□—

More bouquets for the Industrial Hygiene Codes Committee of the A.F.A. The "Code of Recommended Practices for the Protection of Life, Property and Production in the Foundry Industry During the War", developed by that committee and presented serially in the May, June, July and August issues of THE FOUNDRY, is so complete that the Office of Civilian Defense, Chicago Metropolitan Area, was able to publish it for the guidance of all industry in that area. The OCD just removed all reference to the "foundry industry" and the job was done. This suggests the idea that foundrymen in all metropolitan areas might employ this code for the protection of all industry in the district.

Time may show that the preparation of this code was one of the most important projects of the A.F.A.

F.G.S.

Left—General view of the foundry from one end showing some of the equipment installed in the new foundry and its arrangement. Below—Birdseye view of Technological Institute of Northwestern University

Northwestern Tech Has NEW FOUNDRY

By E. F. ROSS
Chicago Editor
The Foundry

AN IMPORTANT unit in the new Technological Institute of Northwestern University, Evanston, Ill., is a foundry designed so that it may be useful to demonstrate modern methods of foundry practice, making of simple castings of any of the commercial metals, and to permit research. Equipment has been installed and placed in operation.

Representing an investment of approximately $20,000, the foundry was designed and installation of equipment supervised by the National Engineering Co., Chicago. Occupying an area approximately 30 x 45 feet on the second floor of the mechanical engineering wing of the building, the unit provides a sand preparation unit with dust collector; a core oven; two types of molding machines; four benches for hand molding; an electric furnace and a gas-fired furnace for metal melting; a monorail hoist for handling molds, cores, ladles, and furnace shells; and complete auxiliary tools and equipment.

The sand conditioning unit, including a screening unit, bucket loader, mixer unit drive, bucket elevator and storage bins, was supplied by the National Engineering Co. A magnetic separator removes small pieces of iron and a special metering device measures water to be added to the molding sand. Dust from the sand conditioner is removed by a dust collector produced by American Air Filter Co. Inc., Louisville, Ky.

The two molding machines are a jolt-squeeze unit manufactured by William H. Nicholls Co. Inc., Richmond Hill, Long Island, N. Y., and a pattern draw unit, supplied by Champion Foundry & Machine Co., Chicago. Cores are baked in a gas-fired oven installed by the Foundry Equipment Co., Cleveland. The oven has a temperature indicator and automatic temperature control apparatus, furnished by the Pyrometer Instrument Co., New York.

A 350-pound, single phase, arc type, rocking electric furnace, built by the Detroit Electric Furnace Division of Kuhlman Electric Co., Bay City, Mich., is employed for melting all ferrous metals and larger quantities of nonferrous metals. It is provided with two shells, one for ferrous and the other for nonferrous. Rated at 125 kilowatts, the furnace operates from a line voltage of 12,000, which is stepped down by two large transformers to 90 volts, and consumes in the neighborhood of 2100 amperes. The transformers, and other electrical equipment, are located in a fully-protected anteroom immediately behind the furnace.

After the furnace has been brought up to heat, around 2500 degrees Fahr., only 50 minutes are required to melt down a full charge of iron. To speed up melting and to lower power cost, the unit may be rocked automatically, thus keeping unmelted metal gradually working into the molten bath. Pouring of molten metal into the ladle is accomplished through remote control, by gradually rolling the furnace forward. For melting small amounts of nonferrous metals, a small Hausfeld gas-fired furnace of 50 pounds capacity, manufactured by the Campbell-Hausfeld Co., Harrison, O., is provided.

(*Concluded on page* 108)

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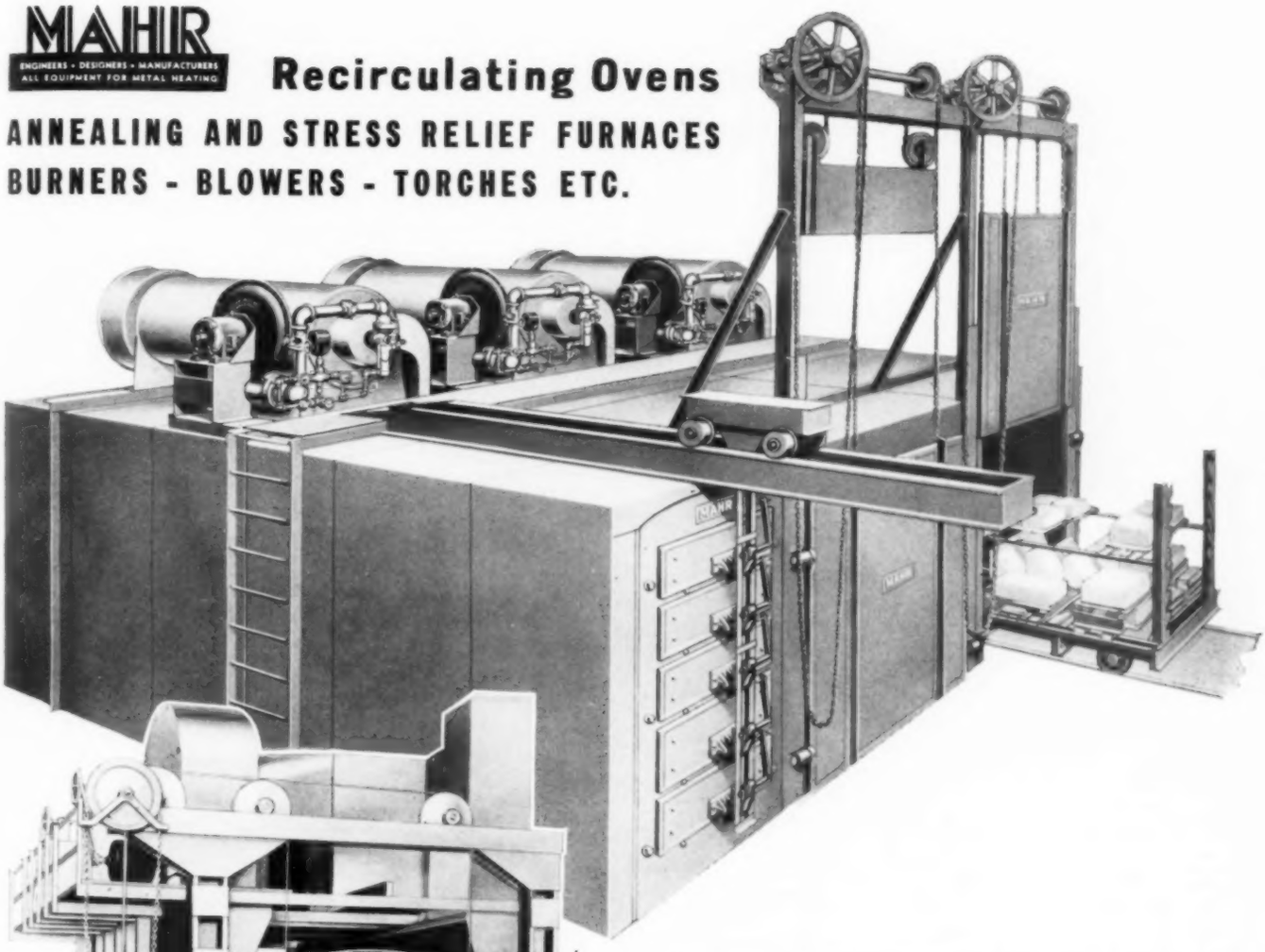

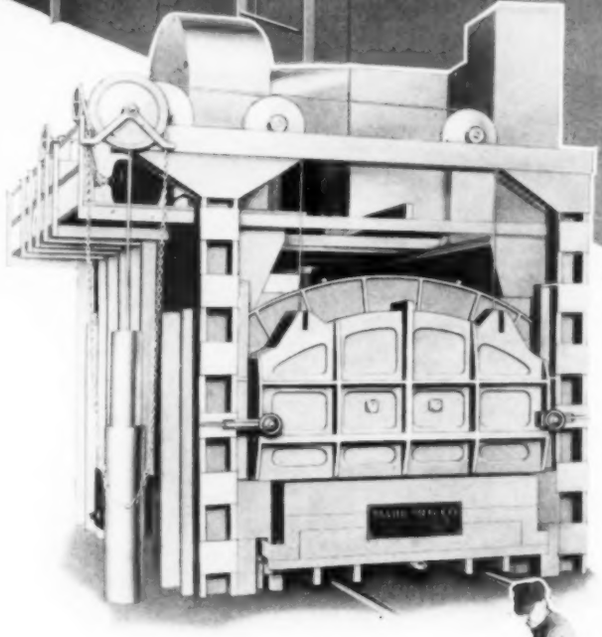

Above is illustrated a typical MAHR Recirculating Core and Mold oven—three compartments, drawer, rack and car. This oven, famous for its quick heat-up and uniform, steady baking temperature, can be had as one unit or in any one of the three. Can be adapted to nearly any space available.

MAHR annealing, stress relief and other kinds of heat treating furnaces are made in all required types—pot, car, pit, etc.—and are helping in war plants all over the country to speed top-quality production.

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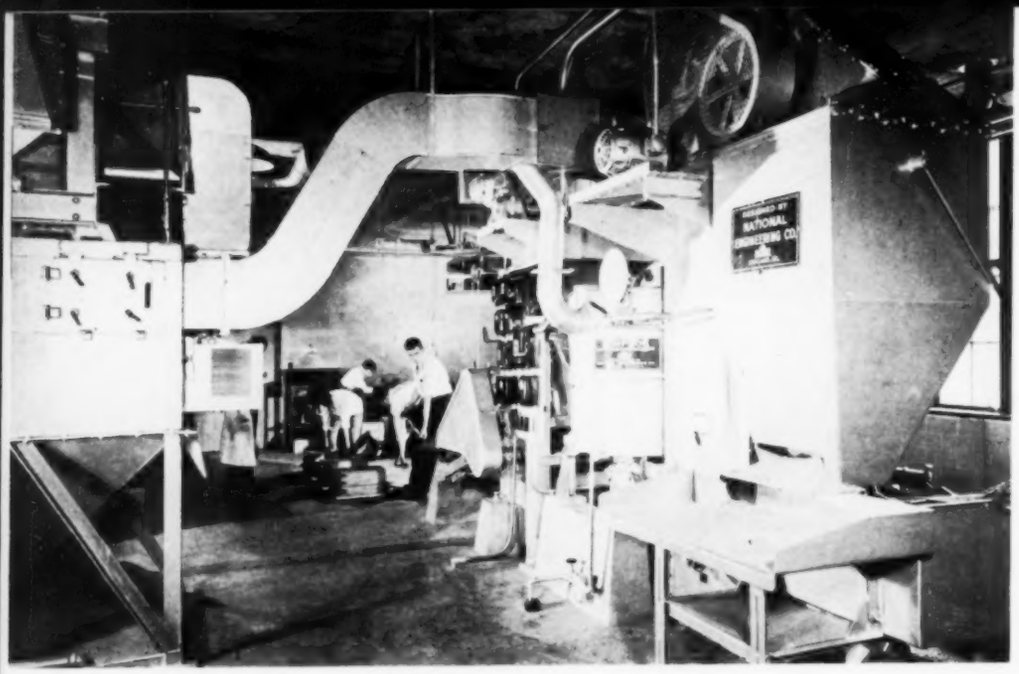
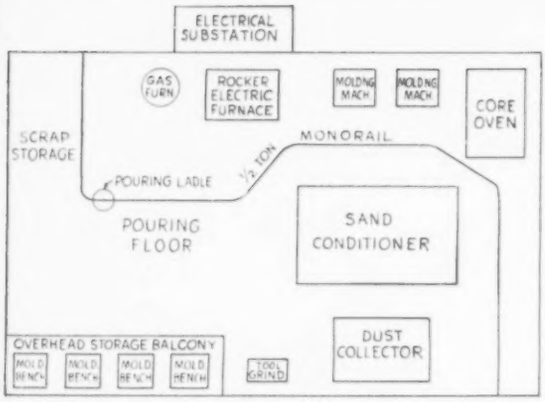




Above—View from opposite end of foundry with sand conditioning apparatus in foreground. Left—Sketch indicating location of equipment and arrangement of the foundry

(*Concluded from page* 106)

Suspended from the ceiling and running over the furnaces, the molding machines and pouring floor is a monorail hoist of ½ ton capacity, this equipment being supplied by the American Monorail Co., Cleveland. A 500-pound capacity pouring ladle, used with the hoist, is the product of the Modern Equipment Co., Port Washington, Wis. Grinding of castings is accomplished on a double-wheel pedestal grinder supplied by the U. S. Electrical Tool Co., Cincinnati.

The four benches for hand molding are located in one corner of the shop. Suspended from the ceiling immediately over the benches is a small balcony for storage of flasks and various foundry tools. All molders' tools and supplies were supplied by S. Obermayer Co., Chicago, and wheelbarrows by the Sterling Wheelbarrow Co., Milwaukee.

Additional equipment used in connection with the foundry is a complete set of sand testing machines and instruments, supplied by Harry W. Dietert Co., Detroit. Along with this, a rockwell hardness tester and other metallographic instruments are available in the metallography laboratory near at hand.

The pattern shop is located adjacent to both the foundry and machine shop, which makes it convenient to design, make, repair and transport patterns. Being near the machine shop, facilities of the latter may be employed to construct metal patterns. Pattern shop is equipped with variable-speed wood lathes and other wood-working tools.

At present 20 students are studying foundry practice and patternmaking, this being a required course for all mechanical and industrial engineering students, and elective to other engineering students. A total of 36 hours during one quarter are spent in these two shops. At present, the training is given in the third year of the 5-year engineering course, but beginning with the September quarter, patternmaking will be included in the freshman schedule, and foundry practice in the third year.

In the beginning shop laboratory courses, the foundry will be used to demonstrate the use of patterns, pattern design, and steps involved in making simple castings of any of the commercial metals. In the advanced courses, the equipment may be utilized to demonstrate and to experiment in problems involving foundry control methods. Research work also will be undertaken as the institute expands its program.

Shop courses are under supervision of the department of mechanical engineering of which Prof. H. S. Philbrick is the present head. However, he will retire Sept. 1 and will be succeeded by Dr. B. H. Jennings. Actual direction of courses are in charge of Royal G. Bigelow, associate professor of industrial engineering. Frank H. Peterson, formerly laboratory assistant and foundry instructor at Armour Institute of Technology, Chicago, and its sucessor, Illinois Institute of Technology, instructs students in foundry practice, and R. S. Lindenmeyer, assistant professor of industrial engineering, teaches patternmaking, and supervises shop work.

Although Northwestern has conducted courses and conferred degrees in several branches of engineering for many years, its new Technological Institute, affording broader teaching and facilities for research, was made possible March 21, 1939, by a gift of $6,735,000 from Walter P. Murphy, chairman, Standard Railway Equipment Mfg. Co., Chicago. Ground was broken April 1, 1940, and the building was completed and occupied last spring.

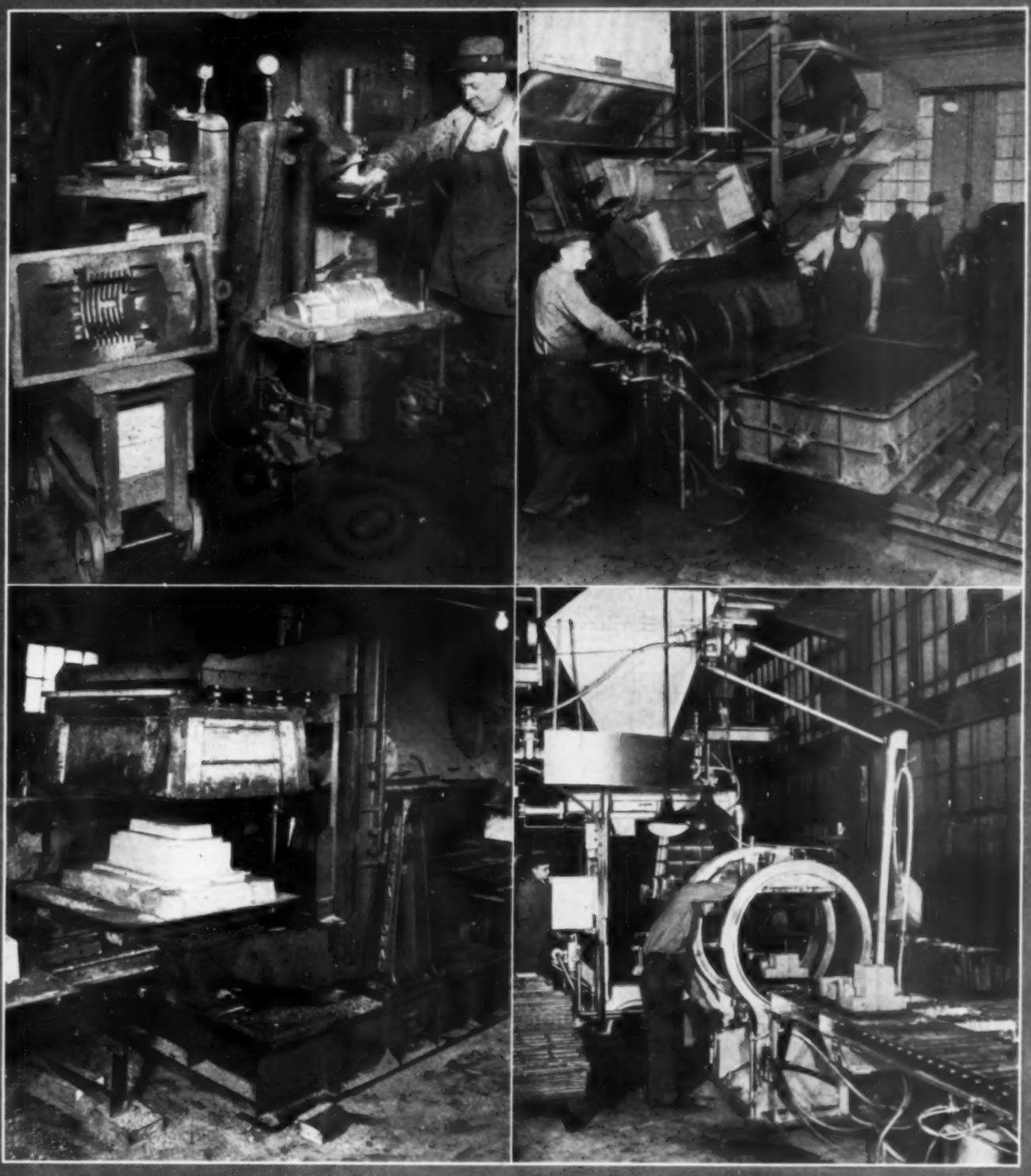
The institute operates on the cooperative plan with a 5-year curriculum. During the first year, students spend all their time in classes; in the remaining four years they alternate classroom work with work in industry for three-month periods. Ovid W. Eshbach is dean of engineering.

Book Review

The Road We Are Traveling—1914-1942, by Stuart Chase, 106 pages, 5½ x 8 inches, cloth, published by the Twentieth Century Fund, 330 West Forty-second street, New York, $1.00.

This is the first of a proposed series of six volumes to be prepared by Mr. Chase for the Twentieth Century Fund and to deal with America's postwar problems.

The volume serves as an introduction to the series, and reviews trends both economic and governmental from 1914 to 1942. The author believes these trends indicate the direction in which America and the world as a whole is traveling and which they will continue to follow after the war. Mr. Chase outlines the controlling elements behind governments and commerce immediately prior to the war as being: Technological advance; flattening population curve; closing frontiers; interdependence of individuals; unemployment; decline of investment opportunities; decline of the free market; propaganda, mechanized warfare; government in business; and national self sufficiency. He feels these elements will influence government and finance after the war as well. These trends, Mr. Chase points out, lead to a revolutionized world order—one with its own problems to be met. He sees no possibility of returning to the world order which ended in 1913.



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activities of foundry groups

New England

EIGHTY members and guests were present at the regular meeting of the New England Foundrymen's Association, held at the Engineers Club, Boston, on June 10. Raymond Meader, president of the association was in charge of the meeting. The speaker, Charles Sleicher, foundry superintendent, New England Butt Co., Providence, R. I., gave a most interesting talk on "The Use of Cement in the Foundry". He pointed out that large castings such as lathe beds and bases are particularly adapted to cement molding. Advantages claimed for making molds with cement are: The mold usually is made more quickly; castings are generally of better quality with few defective ones; process is as cheap and in some cases cheaper than sand method; relieves crowded core or mold drying ovens.

Mixture by volume is 89 per cent sand, 11 per cent cement. This is mixed in an ordinary mechanical mixer for about 2 minutes and then water is added, taking care not to use more than 6 per cent water by volume. The mixture then is shoveled into the mold, no ramming being necessary although tamping is sometimes required.

Mr. Sleicher said his company uses a Providence river bank sand of about 40 grain fineness and any good, quick drying cement is satisfactory. The molds are dried for 72 hours at 70 degrees Fahr. regardless of the size of the mold, since it is necessary only to dry the cement for a sufficient distance in from the mold surface. The one disadvantage of the process is that of obtaining sufficient floor space for drying which can be partially overcome by planning the space available so that the molds can be stacked.

Castings made in cement molds solidify more quickly and tend to give a denser iron with a slight chilling effect on the surface, and their over all shrinkage is less. The mold material can be ground and used again.

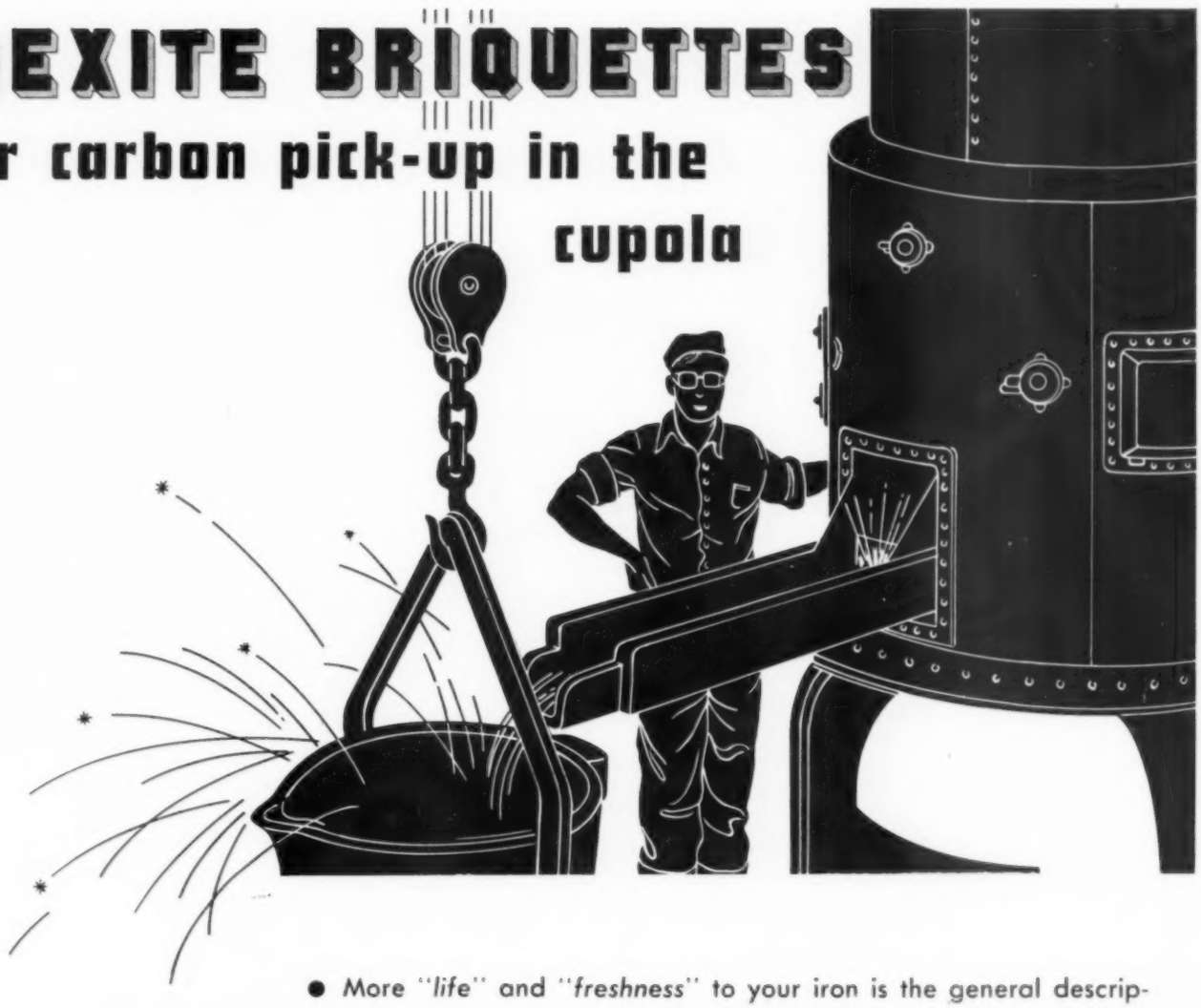
Regarding the preparation of the mold surface, the speaker said that after the mold had dried 24 hours, a cloth is rubbed over the surface

(*Continued on page* 113)

New England had a good turnout at the June 10 meeting. Photos courtesy C. A. Wyatt, Debevoise Anderson Co., Boston

MEXITE BRIQUETTES

for carbon pick-up in the cupola



● More "*life*" and "*freshness*" to your iron is the general description given to heats that have been treated with Mexite Briquettes — *a Mexican Graphite Product* that is a convenient and handy uniform source of carbon in the cupola charge . . . So simple to use that a single Briquette of 3¾ pounds added with the scrap will provide 0.10% carbon; or for every 5% pig iron replaced per ton, two Briquettes will provide an equivalent amount of carbon.

With current conditions imposing occasional uncertain scrap analysis, poor coke or even unfavorable blast pressures, the variations that would likely occur in the carbon content of the molten iron may be greatly reduced through the use of Mexite Briquettes . . . We should like to mail you literature on this or other Mexican Graphite Products listed!

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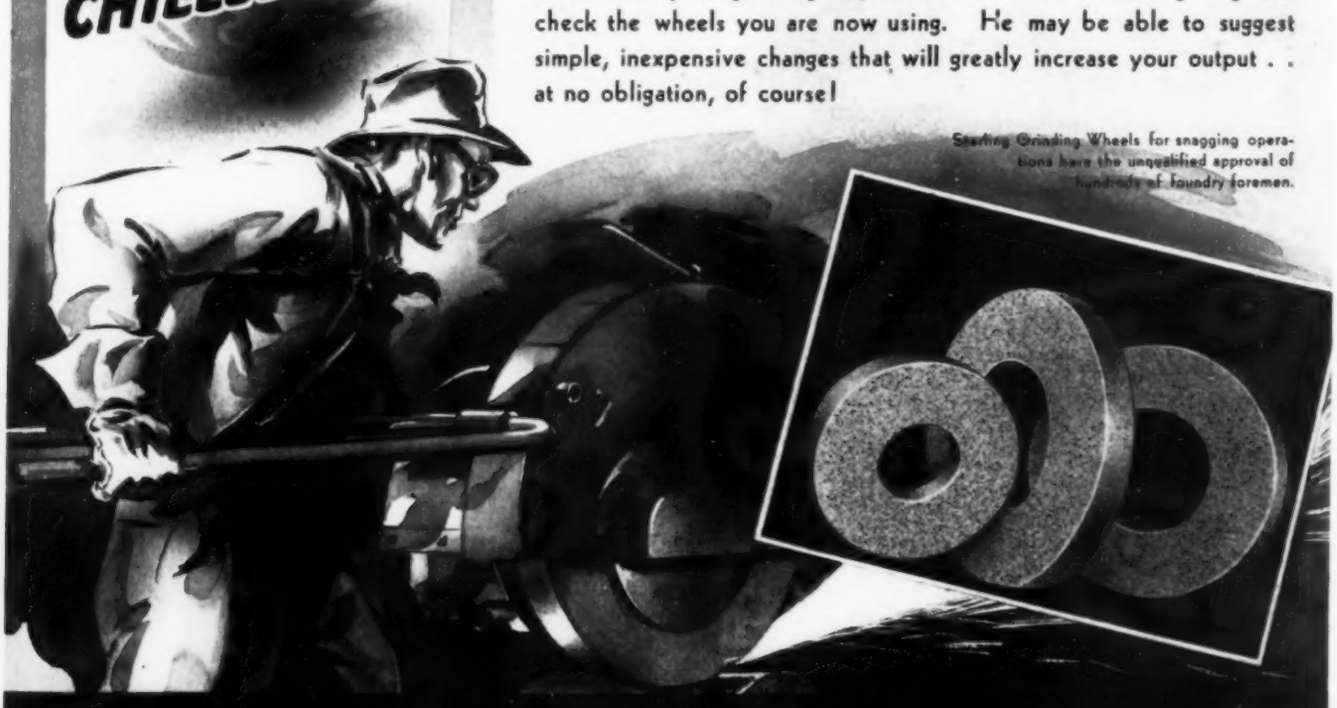

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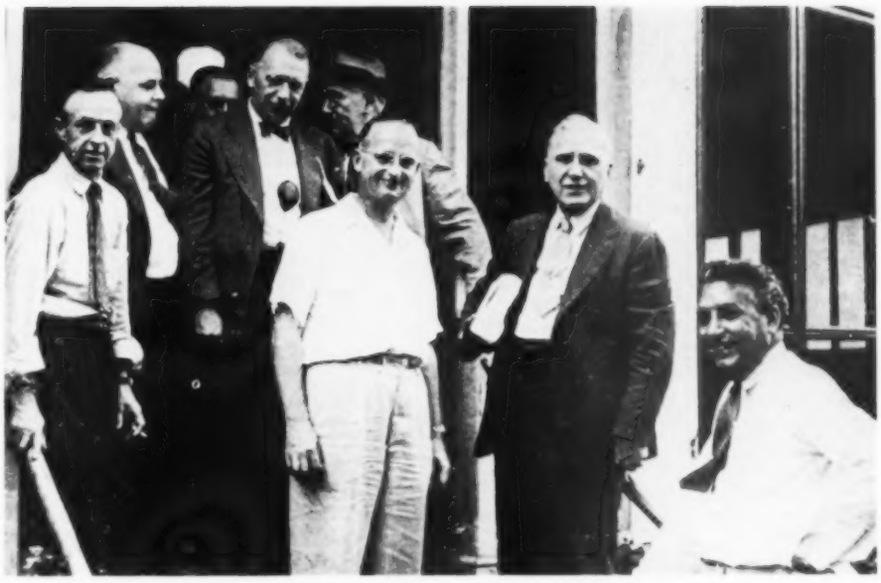
THE WHEELS OF INDUSTRY

(*Continued from page* 110)

to remove all loose sand particles and a coat of blacking brushed or sprayed on. Two more coats of blacking are applied at 4-hour intervals. The blacking should not be rubbed, nor should heat be applied to the blackened surface since the small amount of water will enter into combination with the cement without difficulty.

Cement generally is not used for center cores such as in pipes, ring pots, etc. When large sections are made up, reinforcements are put in the cement to prevent cracking in the corners. When a large job requires more than one day to mold, the pattern has to be removed from the mold at the end of each day to prevent setting up of the cement and seizure of the pattern. After showing a fine collection of photographs of castings and molding procedure with the cement process a general discussion followed in which many present participated.

R. F. Harrington, Hunt-Spiller Mfg. Corp., and chairman of a committee appointed to prepare a resolution on the death of Frederick H. Franklin, read the resolution as drawn up by the committee.—*Merton A. Hosmer.*



C. Howard Paul, Mackintosh-Hemphill Co., Pittsburgh, was honored recently by a group of his friends in the Pittsburgh Foundrymen's Association on the occasion of his retirement from the post of secretary-treasurer of that organization, which he had held for 10 years. An electric desk clock, suitably engraved, was presented to Mr. Paul at the association's annual golf party by H. P. Spilker, Sterrit-Thomas Foundry Co., Pittsburgh, on behalf of the group. In the foreground, left to right are Mr. Paul, Mr. Spilker and J. M. Stewart, Hickman-Williams & Co. In the doorway, left to right, Walter H. White, Pittsburgh Rolls Corp.; Harry D. Fowler, J. S. McCormick Co.; James H. McCrady, J. H. McCrady Sand Co.; and T. A. Reynolds, McConway & Torley Corp.

Metropolitan

OFFICERS of the Metropolitan Chapter of the A.F.A. to serve for the coming year were elected at the chapter's May meeting. F. G. Sefing, International Nickel Co., New York, formerly vice chairman, has been elected chairman to succeed N. E. Woldman, Eclipse Aviation Division, Bendix Aviation Corp., Bendix, N. J. K. V. Wheeler, American Steel Castings Co., Newark, N. J., was elected vice chairman succeeding Mr. Sefing. Secretary, K. A. DeLonge, International Nickel Co., and Treasurer T. D. Parker, Climax Molybdenum Co., New York, were re-elected. Mr. Woldman, as retiring chairman, was elected a director to serve 1 year. Directors elected for a 2-year term are: J. N. Ludwig Jr., Electro Metallurgical Co., New York; A. McIntosh, Wright Aeronautical Corp., Paterson, N. J.; W. G. Reichert, American Brake Shoe & Foundry Co., Mahwah, N. J.; W. C. Schulte, Curtiss Propellor Division, Curtiss Wright Corp., Caldwell, N. J.; and J. W. Reid, R. Hoe & Co., Dunnellen, N. J.—*B. K. Price.*

Views taken at the May 22 meeting of the Chesapeake Chapter. Photos courtesy Frederick Bruggman, Gibson & Kirk Co., Baltimore

Ontario

ELECTION of officers was held at the final meeting of the season for the Ontario Chapter of the A.F.A. which was held at the Royal York Hotel, Toronto, May 29. Officers elected to serve for the coming year include: Chairman, J. J. McFadyen, Galt Malleable Iron Co. Ltd., Galt, Ont.; Vice Chairman, C. C. MacDonald, Frederic B. Stevens of Canada Ltd., Toronto; Secretary-Treasurer, G. L. White, Westman Publications Ltd., Toronto. Directors elected to serve 3 years are: C. O. Williamson, Grinnel Co. of Canada, Toronto; W. W. Nobbs, Clare Bros. & Co. Ltd., Preston, Ont.; and J. A. Wotherspoon, Imperial Iron Corp., St. Catharines, Ont. J. Dalby, Canada Metal Co. Ltd. was elected to serve the unexpired term of N. C. MacPhee, Bureau of Mines, Ottawa, who resigned due to inability to attend the directors meetings.—*G. L. White, secretary-treasurer.*

Cincinnati

TWO hundred members and guests were present to enjoy the annual outing of the Cincinnati District Chapter of the A.F.A. held June 19. Many of those present played golf during the afternoon, arrangements being made through

the courtesy of Billy Gilbert. Prizes to the leading golfers were awarded at dinner. A baseball game between foundrymen and vendors was staged at 6 p.m. with Ray Redmond as manager of the foundrymen and Henry Wood as manager for the vendors. Score of the game which was called at the sixth inning was: Foundrymen 17, vendors 3. An excellent buffet dinner was then served followed by a floor show.

Officers to serve for the coming year also were elected. They are: Chairman, Frank E. Hutchinson, Reliance Foundry Co.; Vice Chairman, E. H. King, Hill & Griffith Co.; Secretary, H. M. Wood, W. W. Sly Mfg. Co.; Treasurer, L. A. Gosiger, S. Obermayer Co. Directors elected to serve 3 years: William W. Beiser, Reliance Foundry Co.; William Gilbert Jr., Buckeye Foundry Co.; David L. Longueville, Wright Aeronautical Corp.; William A. Rengering, Cincinnati Milling Machine Co. E. H. King was appointed program chairman; Charles Hilb, membership chairman; William Gilbert Jr., entertainment chairman; and David L. Longueville, audit chairman.—*Henry M. Wood, secretary.*

Western New York

FOURTH annual picnic of the Western New York Chapter of the A.F.A. was held at Kudara's Farm, June 20. Entertainment included a baseball game between the "Supplies and Demands," golf, and horseshoes. Election of officers to serve for the coming year also was held. R. T. Rycroft, Jewell Alloy & Malleable Co., Buffalo, was elected chairman; Frank Bates, Worthington Pump & Machinery

(*Concluded on page* 116)

Cincinnati Chapter's outing held on June 19 was a huge success. Photos courtesy Ed King, Hill & Griffith Co., Cincinnati

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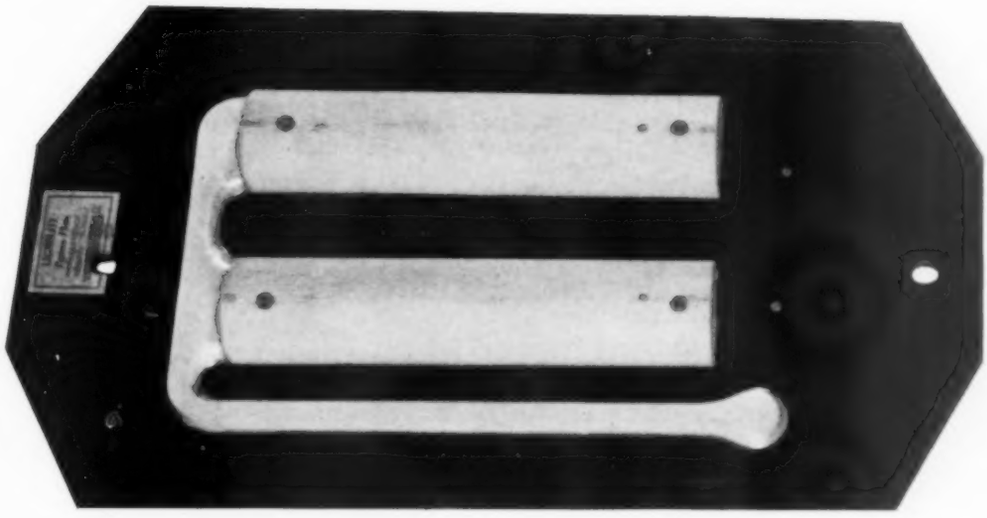

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(*Concluded from page* 114)
Corp., Buffalo, vice chairman; J. R. Wark, Queen City Sand & Supply Co., Buffalo, secretary; M. W. Pohlman, Pohlman Foundry Co. Inc., Buffalo, treasurer. Directors elected to serve 1 year: V. L. Whitehead Jr., Whitehead Bros. Co., Buffalo, to fill the unexpired term of Joseph Kaufman who has moved to Wisconsin; R. D. Loesch, Lake Erie Foundry Co. Inc., Buffalo; and R. K. Glass, Republic Steel Corp., Buffalo; directors to serve 2 years, F. J. Comerford, Rochester, N. Y., J. R. Turner, Queen City Sand & Supply Co., Buffalo; J. L. Yates, Worthington Pump & Machinery Corp., Buffalo; directors to serve 3 years, Everett LeViness, Combined Supply & Equipment Co., Buffalo; and Elliot Jones, Lumen Bearing Co., Buffalo.—*J. R. Wark, secretary.*

Southern California

FINAL meeting of the year for the Southern California Chapter of the A.F.A. was held at the Clark Hotel, Los Angeles, June 16. Past officers gave their reports on the year's activities and new officers and directors were installed. Immediately following the installation, retiring Chairman, George Emmett, was presented with a ring in appreciation of his work during the past year.

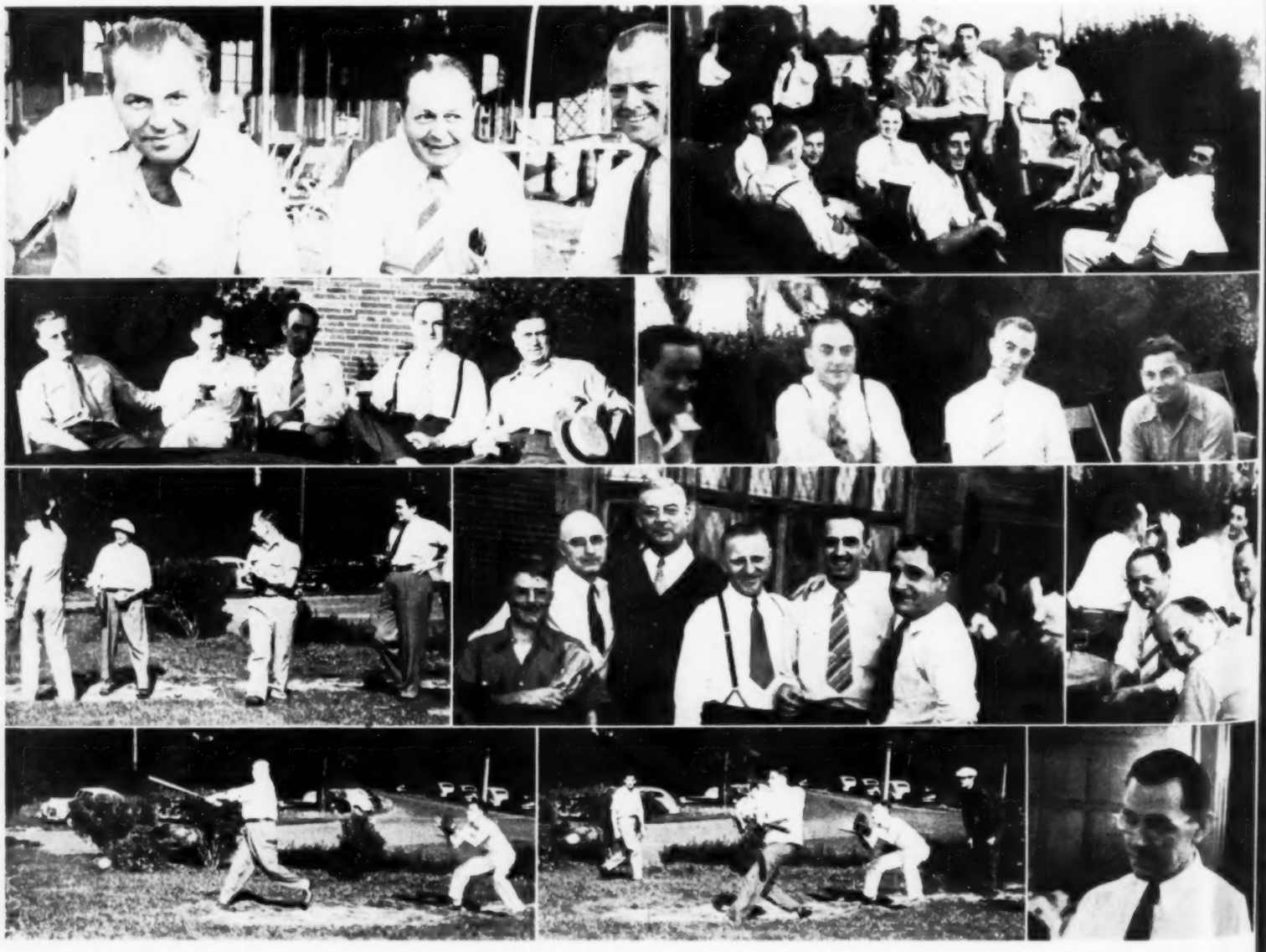
A brief talk on the pig iron situation on the Pacific Coast was given by Lon Ashman, followed by announcement of the chapter's annual summer party.

Principal speaker of the meeting was C. B. Tibbetts, president of the Los Angeles Chamber of Commerce, and president of the Los Angeles Steel Casting Co. Mr. Tibbetts' subject covered plant protection with special emphasis on the foundry's problem in meeting blackout conditions. He assured the group that in the near future plans would be drawn up so that practically all industries in the district would be able to offer protection to their employes during a raid and assist in the camouflage blackout program. —*E. M. Hagener, secretary.*

Northeastern Ohio

THE Northeastern Ohio Chapter went to town on its annual outing and golf tournament held at Lake Forest Country Club, Hudson, O., on June 27. One of the largest delegations of foundrymen and guests attended the event with approximately 350 in attendance. The golfers were out in full strength with about 200 chasing the little white balls around the country side. Chairman Robinson of the entertainment committee, and weather prognosticator par excellence, promised weeks before that not a cloud in the sky would mar the eventful day, and his reputation as a prophet still remains unsullied for the weather was fine. About $100 in prizes were distributed to winners in the golf tournament and as door prizes. As usual the foundrymen found that the batting eyes of the vendors were somewhat out of focus, and won the ball game without difficulty. — *Edwin Bremer, publicity chairman.*

Northeastern Ohio Chapter had nearly 350 at its annual outing. About 200 entered the golf tournament. Photos courtesy Sterling Farmer, Sand Products Corp., Cleveland



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READER'S COMMENT

Readers are invited to comment upon articles and other editorial material appearing in THE FOUNDRY. *The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief.*

THE EDITORS

Front Cover

TO THE EDITORS:

This is just a line to compliment you on the front cover of the July issue of THE FOUNDRY. The picture and the color and the arrangement have made, to our minds, a very nice looking job.

W. C. STEVENSON
Vice President
Hickman, Williams & Co.
Cleveland

TO THE EDITORS:

Have just received the July issue of THE FOUNDRY and wish to congratulate you on a most interesting and beautifully gotten up number. The front cover is one of the prettiest I have seen, and your editorial exceedingly good.

T. H. BENNERS JR.
T. H. Benners & Co.
Birmingham, Ala.

Good Editorial

TO THE EDITORS:

Your editorial in the July issue of THE FOUNDRY is a very worthwhile one, which I am sure all the gray iron foundrymen will appreciate, and do a lot of good for the industry.

A. J. RUMELY
LaPorte Foundry Co.
LaPorte, Ind.

Opens Tap Hole

TO THE EDITORS:

Occasionally difficulty is encountered by the cupola tap hole freezing up, and the usual procedure in opening it up again is to drive in a pointed bar with a sledge hammer. However, not so long since I saw a frozen tap hole opened up easily and with dispatch. One of the plant welders used a ¼-inch steel rod in an electric welding torch. After creating the arc he held the rod against the frozen metal in the tap hole until it was melted, and then the molten iron in the cupola cleaned it out. It was the first time I ever saw the operation performed, but it sure beats the old way of using a rod and sledge. A steel rod should be used in opening the hole since an iron rod will weld to the frozen iron.

CLARENCE J. WHITE
Mount Vernon, O.

Fast Melting

TO THE EDITORS:

You may be interested to know that my experience does not coincide with the advice you offer in an item in the *Question and Answer* section of the December 1941 issue of THE FOUNDRY entitled *Tuyeres Needed in a New Cupola.*

Our cupola 34-inch shell, lined to 24 inches diameter, 11 feet 6 inches from sand bed to charging door has six tuyeres 4 x 6 inches inside, 4 x 4 inches at shell and staggered. The three lower tuyeres are 14 inches above the sand bed. The three upper tuyeres are 18 inches above the bed. Inside the wind belt, 12 x 15 inches, the tuyere openings are fitted with butterfly valves. Air from the blower driven by a 5 horsepower motor at 3000 revolutions per minute enters through an 8-inch diameter pipe. The slag hole is 11 to 12 inches above the sand bed.

The coke bed, 364 pounds, extends upward 18 to 20 inches above the tuyeres. The iron charge is 560 pounds and coke splits are 45 pounds each, with 60 to 70 pounds of limestone per ton of iron. The cupola consistently melts 2½ tons per hour, of which a considerable amount is semisteel for machine tool castings. Operation of the cupola has aroused considerable comment in local foundry circles. We shall be pleased to have comment from American and other foundrymen readers of THE FOUNDRY.

We also operate a smaller cupola lined to 18 inches and provided with four tuyeres. Air is supplied by the blower previously mentioned, but is reduced in volume by a gate in the blast pipe. The coke bed, 250 pounds, extends to a point 18 to 20 inches above the tuyeres. The first iron charge is 336 pounds. Subsequent charges of iron and coke are 168 and 18 pounds respectively. Extra hot iron is taken from this cupola at the rate of 2500 to 2800 pounds per hour. From the beginning up to the present, this cupola has melted approximately 600 tons.

V. V. ROGERS
F. W. Hercus Mfg. Co. Ltd.
Southwark, South Australia

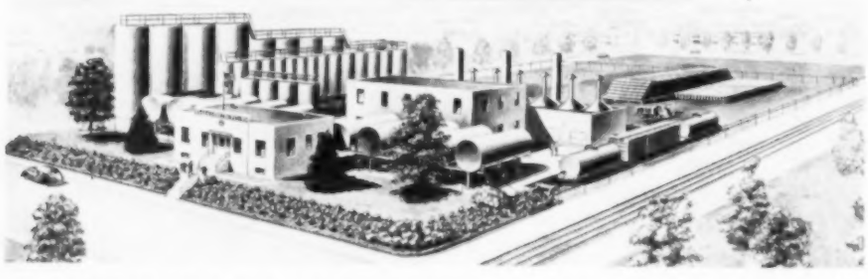
Book Review

An Engineer's War, by A. C. Thomson; paper, 191 pages 5 x 7 inches; 67 illustrations; obtainable through *The Engineer and Foundryman* (Pty) Ltd., Johannesburg, South Africa. Price 6/6d.

In a foreword to this interesting volume, Dr. H. J. van der Bijl, Director General of War Supplies, points out that the full story of what has been accomplished cannot be written at this time. The present account may be termed an interim tribute to the engineering industry as a whole. These men deserve great credit for the manner in which they adapted and improved existing means for the manufacture of war material never before attempted in South Africa. The speed with which they forged ahead was truly remarkable.

The author states that while the activities described constitute only a portion of the industry's achievements in defense production, the field covered may be regarded as constituting a fairly representative cross section. The book is a compilation of articles which appeared monthly in the *Engineer and Foundryman.*

The title page carries the announcement that no gain whatever accrues from this publication. The entire profits are and will be donated to the South African Seaward defense. Scope of the work is indicated in the chapter headings: High tensile and microscopic measurements, field mortars, field mortar bombs, aircraft bombs and depth charges, tails for practice bombs, hand grenades, romance of the 3.7 howitzer, spirit level glasses, shells, cartridge cases, shell fuzes, single purpose lathes, machinery and equipment, gun aiming posts, Bellman hangars, portable bridges, light gage pipes, air raid sirens, armored cars, transport vehicles, the steel industry, casting a marine cylinder, after victory.



Certified Core Oil & Mfg. Co., Chicago, recently completed a new plant at 3308 South Cicero avenue, Cicero, Ill. The plant includes a laboratory for testing products at the plant and for assisting foundries in speeding war production

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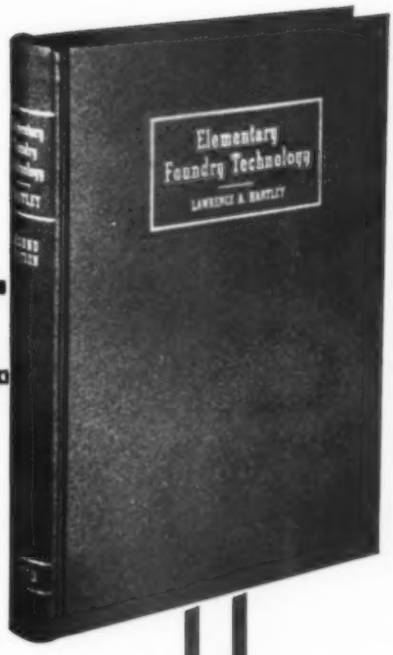

★ Revised and brought up-to-date with a completely new chapter on malleable cast iron foundry practice, the Third Edition of "Elementary Foundry Technology" will soon be ready for distribution.

Fundamental data on both foundry practices and those related subjects of importance to foundrymen are thoroughly covered for use of apprentices and young men studying modern foundry operation and management.

This book contains material conforming to the requirements for instruction as set up in the minimum standards of four year foundry apprenticeship in the United States. It is sponsored by the National Founders Association, Chicago.

In addition to the completely new chapter on malleable cast iron foundry practice, the chapter on pig iron is revised to make it conversant with present day practice. Additional references are included.

Well over half of the book is devoted to discussion of fundamentals of foundry practice, with special reference to the field of gray iron and steel manufacture. Foundry subjects covered include . . . Elements of Iron . . . Iron Manufacture . . . The Cupola and Its Operation . . . Elementary Problems in Steel Foundry Production . . . Brass Melting . . . Foundry Sands . . . Gates and Risers . . . Molding Machines . . . Core Machines . . . Long Life Molds . . . Malleable cast iron foundry practice.

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"Elementary Foundry Technology", by L. A. Hartley; Third Edition revised by Edwin Bremer and Pat Dwyer; 377 pages; 6 x 9 inches; 132 illustrations, 16 tables; includes glossary, index and bibliography; sponsored by the National Founders Association, Chicago; Price $3.00, postpaid; Published by The Penton Publishing Co., Cleveland.

Employes of Chicago Malleable Castings Co. cited for War Bond purchases

Chicago Malleable Wins Award

With 94 per cent of the office, supervisory and shop employes regularly purchasing War Bonds under the pay roll deduction plan, the Chicago Malleable Castings Co., Chicago, was presented the Minute Man Flag and citation on June 29. Presentation was made for the Treasury Department by John G. Gallaher, deputy state administrator, in the presence of all available employes. Arrangements were supervised by Don D. McKiernan, chairman of special events committee, Treasury Department. Introductions were made by L. F. Hartwig, works manager, N. Maro, president of the union local, and Mr. McKiernan. The citation was accepted for the company by J. M. Gradle, assistant secretary and treasurer, and for the employes by Albert Gatz, an old employe who has two sons in the armed services and a third preparing to enter. Joining in that part of the program was John Black, senior foreman, and C. Peterson, foreman, each having two sons in the armed forces. Introductions were acknowledged by W. L. Beaudway, vice president, and W. F. Hoffman, secretary of the company.

Representatives shown in the accompanying illustration are as follows: Company—W. L. Beaudway, L. F. Hartwig, W. F. Hoffman, J. M. Gradle, John Black and C. Peterson; Marines—Privates first class, J. Z. Carter, J. M. Cochran, J. H. Edwards and P. W. Hardy; American Red Cross—Privates Miss Anita McCahey and Mrs. Charles Hicks; United Steel Workers of America—Nick Maro, Peter Zozak, Dan Cialdella, Steve Matras, William Lewis, Alvert Gatz; Treasury Department—Don D. McKiernan, John G. Gallaher and J. R. Conlin.

Conducts Research In Metallurgy

Work of the Metals and Minerals Committee and the new War Metallurgy Committee of the National Academy of Sciences recently were outlined by Frank B. Jewett, president. During the past 18 months, the Metals and Minerals Advisory Committee has supplied the OPM and the WPB with 113 reports. Of these 53 were on metals substitution and conservation, 47 on ferrous minerals and ferroalloys, 4 on tin smelting and reclamation, and 9 on nonmetallic minerals. These reports dealt principally with problems arising from allocations and substitution of materials, for both civilian and war use.

Clyde Williams, director, Battelle Memorial Institute, Columbus, O., and chairman of the advisory committee, also is chairman of the new War Metallurgical Committee, which has been set up to appraise and conduct needed research for the army, navy and other governmental departments, as well as for industry. The committee collects data and information as requested by the WPB or the Office of Scientific Research and Development, through its National Defense Research Committee. Another function of the War Metallurgy Committee is to digest and make available to those engaged in war work the results of both Canadian and English research.

The War Metallurgy Committee is composed of the following:

Clyde Williams, chairman, Battelle Memorial Institute, Columbus, O.; Zay Jeffries, vice chairman, General Electric Co., Cleveland; Louis Jordan, secretary, National Academy of Sciences, Washington; Carl Breer, Chrysler Corp., Detroit; Dr. Lyman J. Briggs, U. S. Bureau of Standards, Washington; Col. H. H. Zornig, Ordnance Department, Watertown Arsenal, Watertown, Mass.; James H. Critchett, Union Carbide & Carbon Research Laboratories, New York; Col. R. S. A. Dougherty, Bethlehem Steel Co., Bethlehem, Pa.; Rudolph Furrer, A. O. Smith Corp., Milwaukee; Dr. H. W. Gillett, Battelle Memorial Institute, Columbus, O.; S. D. Heron, Ethyl Gasoline Corp., Detroit; Dr. R. P. Heuer, General Refractories Co., Philadelphia; Col. G. F. Jenks, Ordnance Department, Washington; Dr. John Johnston, Research Laboratory, U. S. Steel Corp., Kearny, N. J.; Dr. Vsevolod N. Krivobok, Lockheed Aircraft Corp., Burbank, Calif.; Frederick Laist, Anaconda Copper Mining Co., New York; Dr. W. K. Lewis, Department of Chemical Engineering, Massachusetts Institute of Technology, Cambridge, Mass.; Dean C. E. MacQuigg, College of Engineering, Ohio State University, Columbus, O.; C. E. McCuen, General Motors Corp., Detroit; Dr. Robert F. Mehl, Metals Research Laboratory, Carnegie Institute of Technology, Pittsburgh; Dr. Paul D. Merica, International Nickel Co. Inc., New York; Dr. Gilbert E. Seil, E. J. Lavino & Co., Norristown, Pa.; Capt. Lybrand Smith, Office of Coordinator of Research and Development, Navy Department, Washington; Dr. F. W. Willard, Nassau Smelting & Refining Co., New York; Dr. Robert S. Williams, Department of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.; Col. A. E. White, University of Michigan, Ann Arbor, Mich.

The advisory committee is composed of the following groups:

Ferrous Minerals & Ferroalloys Group: Gilbert E. Seil, chairman, E. J. Lavino Co., Norristown, Pa.; A. C. Fieldner, secretary, U. S. Bureau of Mines, Washington; Ralph Bowman, Republic Steel Corp., Cleveland; Frederick G. Cottrell, Washington; James Critchett, Union Carbide & Carbon Research Laboratories, New York; John V. N. Dorr, Dorr Co., New York; Charles H. Herty Jr., Bethlehem Steel Co., Bethlehem, Pa.; Donnell F. Hewett, U. S. Geological Survey, Washington; John Johnston, U. S. Steel Corp., Kearny, N. J.; Frederick Laist, Anaconda Copper Mining Co., New York; Enoch Perkins, Mutual Chemical Co. of America, New York.

Metals Conservation and Substitution Group: Zay Jeffries, chairman, General Electric Co., Cleveland; Dr. Paul D. Merica, vice chairman, International Nickel Co., New York; W. H. Eisenman, secretary, American Society for Metals, Cleveland; Robert S. Archer, Republic Steel Corp., Chicago; E. W. Bennett, Dow Chemical Co., Midland, Mich.; A. L. Boegehold, General Motors Corp., Detroit; S. K. Colby, Aluminum Co. of America, Pittsburgh; Maj. G. L. Cox, Ordnance Department, Watertown Arsenal, Watertown, Mass.; D. K. Crampton, Chase Brass & Copper Co., Waterbury, Conn.; Lieut. Col. L. S. Fletcher, Frankford Arsenal, Philadelphia; John R. Freeman Jr., American Brass Co., Waterbury, Conn.; James P. Gill, Vanadium-Alloys Steel Co., Latrobe, Pa.; Dr. H. W. Gillett, Battelle Memorial Institute, Columbus, O.; W. C. Hamilton, American Steel Foundries, East Chicago, Ind.; Charles H. Herty Jr., Bethlehem Steel Co., Bethlehem, Pa.; John Johnston, U. S. Steel Corp., Kearny, N. J.; A. B. Kinzel, Union Carbide & Carbon

Research Laboratories, New York; Robert H. Leach, Handy & Harman, Bridgeport, Conn.; Robert F. Mehl, Carnegie Institute of Technology, Pittsburgh; W. M. Peirce, New Jersey Zinc Co., Palmerton, Pa.; Albert J. Phillips, American Smelting & Refining Co., Barber, N. J.; William B. Price, Scovill Mfg. Co., Waterbury, Conn.; H. S. Rawdon, U. S. Bureau of Standards, Washington; Walter C. Smith, Cerro de Pasco Copper Co., New York; Jerome Strauss, Vanadium Corp. of America, New York; W. P. Woodside, Climax Molybdenum Corp., Detroit; F. W. Willard, Nassau Smelting & Refining Co., New York.

Nonmetallic Minerals Group: R. P. Heuer, chairman, General Refractories Co., Philadelphia; Paul Tyler, secretary, U. S. Bureau of Mines, Washington; L. E. Barringer, General Electric Co., Schenectady, N. Y.; G. O. Bole, Orton Ceramic Foundation, Columbus, O.; B. C. Burgess, United Feldspar & Minerals Corp., Spruce Pine, N. C.; W. S. Landis, American Cyanamid Co., New York; M. M. Leighton, State Geological Division, University of Illinois Campus, Urbana, Ill.; G. R. Mansfield, U. S. Geological Survey, Washington; Oliver C. Ralston, U. S. Bureau of Mines, College Park, Md.; Robert B. Sosman, U. S. Steel Corp., Kearny, N. J.; John D. Sullivan, Battelle Memorial Institute, Columbus, O.; Frank J. Tone, Carborundum Co., Niagara Falls, N. Y.; William M. Weigel, Missouri Pacific Railroad Co., St. Louis; R. B. Wittenberg, International Agriculture Corp., New York.

Tin Smelting and Reclamation Group: F. W. Willard, chairman, Nassau Smelting & Refining Co., New York; P. M. Ambrose, secretary, U. S. Bureau of Mines, Washington; W. K. Lewis, Massachusetts Institute of Technology, Cambridge, Mass.; M. F. McConnell, Carnegie Illinois Steel Co., Pittsburgh; Walter C. Smith, Cerro de Pasco Copper Co., New York; John F. Thompson, International Nickel Co. Inc., New York.

Alumina Subcommittee: John D. Sullivan, chairman, Battelle Memorial Institute, Columbus, O.; Francis C. Frary, Aluminum Co. of America, New Kensington, Pa.; Oliver C. Ralston, U. S. Bureau of Mines, College Park, Md.; R. S. Sherwin, Reynolds Metals Co., Sheffield, Ala.; and Arthur Fleischer, Kalunite Co., Salt Lake City.

Among societies functioning are: American Institute of Mining and Metallurgical Engineers; American Society for Testing Materials; American Society of Mechanical Engineers; American Society for Metals; Society of Automotive Engineers; Engineers Defense Board; American Institute of Chemical Engineers; Army Ordnance Association; American Iron and Steel Institute; American Ceramic Society.

M. J. Gregory, factory manager, Foundry Division, Caterpillar Tractor Co., Peoria, Ill., and a director of the American Foundrymen's Association, recently got a lot of pleasure in presenting Neal B. Hamilton of Caterpillar a check for winning first place in the A.F.A. gray iron molding division apprentice contest

Belle City Foundry Wins Flag

On June 4 Lieut. Col. William B. Hobbs, Chicago Ordnance District, presented the United States Army Ordnance flag to C. S. Anderson, president, Belle City Malleable Iron Co. and the Racine Steel Castings Co., Racine, Wis., in recognition of the achievement in doubling production records during the past year. More than 900 employes and officers of the two companies pledged continued support to an increased war production program as the flag was raised. The firms were among the first in the district to convert to 100 per cent production of materials for the armed forces. Mayor Gleason Morris expressed the city's appreciation in having the honor conferred.

Annual Meeting

Gray Iron Founders' Society, Cleveland and Washington, will hold its annual convention at the Hotel Cleveland, Cleveland, Friday, Oct. 9. Details of the program will be announced later. W. W. Rose is executive vice president.

Photographs taken during the presentation of the Army Ordnance Flag to the Belle City Malleable Iron Co. and the Racine Steel Castings Co., Racine, Wis. C. S. Anderson, president of both companies, is shown above at the right

foundry activities

FOUNDRY Division, North Wales Machine Co., North Wales, Pa., is being operated as a separate company under the name of King Foundries, Inc. Officers include the following: President, Treasurer and Manager, J. W. King; Vice President, F. M. King Jr.; Secretary, W. P. King, and Assistant Secretary, Kenneth King.

* * *

Montreal Foundry Ltd., 1260 Conde street, Montreal, Que., has let contract for plant addition.

* * *

Electric Steel Ltd., Cap de la Madeleine, Que., Canada, plans a further addition to its plant.

* * *

Cincinnati Milling Machine Co., Cincinnati, will build an addition to its foundry.

* * *

Fairmount Foundry, Third and Westmoreland streets, Philadelphia, has plans for a foundry.

* * *

Alten Foundry & Machine Co., Lancaster, O., suffered $2500 damage to its pattern shop.

* * *

Blackmer Pump Co., Grand Rapids, Mich., has been granted a permit to construct an addition to its plant.

* * *

Wm. Powell Co., 2525 Spring Grove avenue, Cincinnati, has purchased land for expansion of its plant.

* * *

Collingwood Shipyards Ltd., Collingwood, Ont., is taking bids for a foundry addition. J. S. Leitch is general manager.

* * *

Vulcan Iron Works, Sutherland and Maples avenues, Winnipeg, Man., has let contract for a plant addition.

* * *

Bosworth Foundry Inc., 111 West Jackson boulevard, Chicago, has been incorporated with 5000 shares of common stock by J. J. Melbrod, G. P. Beringer, and J. A. Schultz.

* * *

Washington-Eljer Co., 2035 East Vernon avenue, Los Angeles, a producer of gray iron and nonferrous castings, has converted the major part of its foundry to the production of steel castings.

* * *

Long Foundry Co., Tacoma, Wash., has been incorporated with $24,000 capital by Joe L. Long and associates to operate foundry and machine shop.

* * *

Wellman Bronze & Aluminum Co., 6017 Superior avenue, Cleveland, plans further expansion to its plant. A machine shop of 3000 square feet is planned.

* * *

Otis Elevator Co., 775 Main street, Buffalo, plans an addition and alterations to its plant. O. D. Conover, 1740 East Twelfth street, Cleveland, is engineer.

* * *

Russell & Sons Foundry, Newburyport, Mass., was sold approximately 5 months ago. New equipment has been installed in the plant which is more than 100 years old. The foundry's entire production is on war material. William B. Richardson is superintendent.

* * *

Canada Iron Foundries Ltd., Sun Life building, Montreal, Que., has given general contract to Joseph Renaud, 145 Laviolette street, for an addition to its plant in Three Rivers, Que.

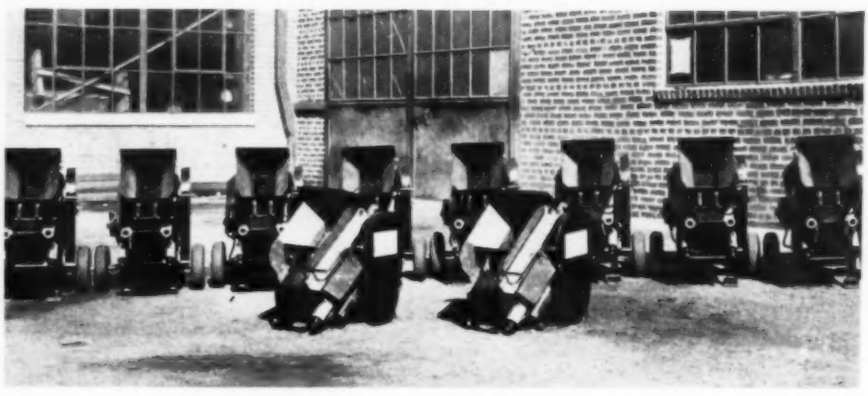
* * *

Index of orders for new equipment for May, 1942, according to a report of the Foundry Equipment Manufacturers' Association, Cleveland, was 730.2 compared with 1307.7 in April. Index for repairs was 423.3. Index of 100 represents the monthly average of reported sales to metal working industries during 1937-38-39.

Honored Again

Huntington Works, International Nickel Co. Inc., Huntington, W. Va., has been awarded the All-Navy "E" for excellence in production of ordnance and other material for the United States Navy. This is the second time the plant has been honored by the Navy department, the Navy Ordnance "E" and Ordnance flag having flown on its flag pole since last August.

Produces Four Thousandth Sand Unit



Royer Foundry & Machine Co., Kingston, Pa., recently completed the 4000 sand conditioner produced by the company. This unit, with 9 others, was shipped to a large plant producing aircraft castings. President S. B. Davies of that company pointed out that in peace-time the organization would have made considerable to-do over the event, but under the present speed up for war, the event would have been overlooked had it not been for an alert shipping clerk who noted this interesting fact and brought it to attention of the management

Obituary

JAMES MILLAR, 67, who retired in 1937 as general superintendent, Buffalo Foundry & Machine Co., Buffalo, died at his home in that city June 29. Mr. Millar was born in Glasgow, Scotland. After serving his molder's apprenticeship in Scotland, he worked in leading marine shops on the Clyde. When he came to the United States in 1900, Mr. Millar traveled throughout the country and worked in many of the larger foundries. He served as general superintendent of the Buffalo Foundry & Machine Co. for 35 years prior to his retirement. For the past 5 years he devoted his time to his hobby, the raising and flying of homing pigeons.

* * *

William M. Hager, 74, who retired in 1940 as vice president, American Car & Foundry Co., New York, died July 1, in Montclair, N. J.

* * *

George L. Cadman, 80, since 1907 an engineer associated with the Beloit Iron Works, Beloit, Wis., died in that city, June 15.

* * *

Walter H. Thomas, president, Straight Line Foundry & Machine Corp., Syracuse, N. Y., died recently. Mr. Thomas had been with the company for 25 years.

* * *

Frederick Glander, 72, formerly general superintendent, Renown Stove Co., Owosso, Mich., died in that city, recently. Mr. Glander joined the company when it was founded in 1906.

* * *

John R. Bucher, 55, sales manager, Canton, O., division, Hill Acme Co., Cleveland, died July 8, after a prolonged illness. Mr. Bucher formerly was associated with the Canton Foundry & Machine Co., Canton.

* * *

James T. Merriman, superintendent for 33 years of the Madison Foundry Co., Cleveland, died recently following an illness of several months. Mr. Merriman had been associated with the Madison company for more than 40 years.

* * *

A. J. Troja, operating superintendent and sales agent, Griffin Wheel Co., Los Angeles, died at his home on July 6. Mr. Troja started working as a boy for the Fort Madison Car Wheel Co. in the late 90's and continued in the chilled car wheel industry when the Griffin Wheel Co. took over the Iowa foundry in 1901. He operated many of its wheel foundries and spent several years in Detroit before he was called to Chicago to manage

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the Inspection Division. In 1914, when Griffin built its last manually operated plant, Mr. Troja went West to start operations. In the chilled iron industry he was one of the best known men because of his collaboration on the development of improved manufacturing processes to meet the increased service demands of railroad requirements.

* * *

Robert F. Runge, vice president, SKF Industries Inc., Philadelphia, died July 6, in Germantown Hospital after a prolonged illness. Mr. Runge was graduated from Drexel Institute in 1906 and went to work in the engineering department of the Hess-Bright Mfg. Co., which later became SKF.

* * *

Arthur K. Reading, assistant chief, Forgings and Castings Unit, Iron and Steel Branch, War Production Board, Washington, died Wednesday, July 8, in that city. Mr. Reading was born Oct. 17, 1882 at Davenport, Iowa, and was educated in the public schools of that city. He was graduated from Purdue University in 1905 with a bachelor of science degree in mechanical engineering. During the summer vacations while attending college he worked as draftsman with the Bettendorf Co., Bettendorf, Iowa, and resumed that position for a year following graduation. He then became an estimator for the American Car & Foundry Co., St. Louis, but a year later returned to the Bettendorf Co. as an estimator. In 1909 he was made chief draftsman for that organization, in 1910 was appointed mechanical engineer and held that position until 1919 when he became general manager of the Zimmerman Steel Co., Bettendorf. Mr. Reading joined the Office of Production Management, predecessor of WPB in October, 1941.

* * *

Roy Edward Lee, for the past 3 years, superintendent, Newbury Mfg. Co., Talladega, Ala. died recently. Mr. Lee held positions with the Crane Co., Chattanooga, Tenn.; Peerless Foundry Co., Cincinnati; Alabama Pipe Co., Anniston, Ala.; Central Foundry Co., Holt, Ala.; and the Stockham Pipe Fittings Co., Birmingham.

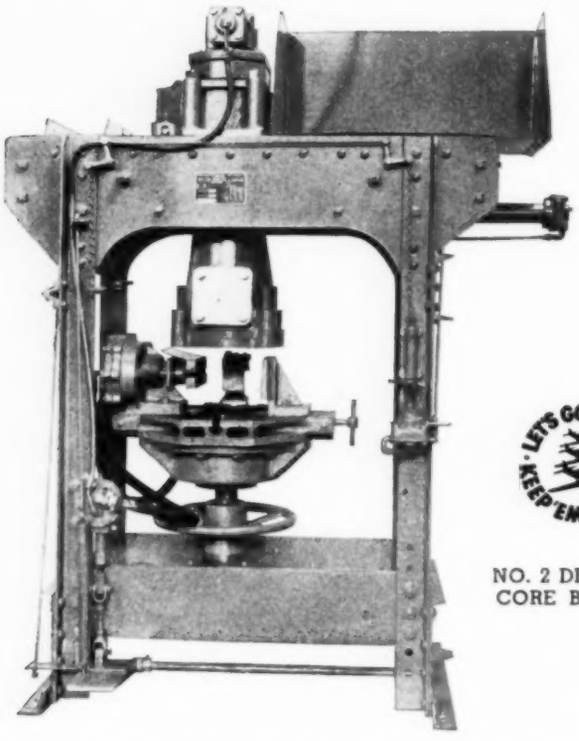
* * *

C. A. Hamilton, president, Alabama Pipe Co., Anniston, Ala., died June 18 in Anniston. Mr. Hamilton was the first person born in Anniston after it was chartered as a municipality and as a boy entered the employ of the Alabama Pipe Co. He was active in the affairs of the Associated Industries of Alabama and a founder of the Alabama State Chamber of Commerce.

Office For Emergency Management recently has issued an "OEM Handbook" describing the functions and organization of the war agencies. The booklet describes the WPB, OPA and other constituent agencies of the OEM. Copies may be secured from the Superintendent of Documents, Washington, and at OEM field offices.

★ ★ ★ 32nd YEAR ★ ★ ★

DEPENDABLE **CORE BLOWING** EQUIPMENT



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NO. 2 DEMMLER CORE BLOWER

This standard machine is suitable for a wide range of core work in gray iron and malleable shops. Built into it are years of practical experience working with foundrymen . . . its high efficiency and simplicity of operation assure the SPEED and ACCURACY so necessary in today's drive for immediate production. It will give you long, satisfactory service with little attention. Investigate the possibilities of this and other standard and special machines made by WM. DEMMLER & BROS., KEWANEE, ILLINOIS.

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CORE BLOWERS *Exclusively*

Women in Industry

In foundries, as in all war industries, the number of women employed in manufacturing operations is increasing. Pictured above are five girls washing up at the end of the shift

FOUNDRYMEN GATHER IN LONDON

(*Continued from page 92*)

ing as Mr. Oliver Lyttleton recommended the other day, to make the world, and especially our own immediate world, happier and better as a result of our efforts."

The main feature of the morning's session was the presentation of the Edward Williams lecture by Dr. H. W. Gillett, chief technical adviser, Battelle Memorial Institute, Columbus, who had chosen for his subject "Foundry Teamwork". Owing to the fact that Dr. Gillett was unable to come to England to present his lecture, it was read by J. G. Pearce, director of the British Cast Iron Research Association. After paying tribute to C. E. Williams, past president of the Institute, who founded the annual lecture which bears his name, Dr. Gillett emphasized the importance of teamwork in the foundry. He said that "the trouble with industrial research does not lie so much in lack of facilities in any industrial nation for development of facts by research, or in means for spreading those facts on the public records. The pages of the transactions of technical societies, and of other technical journals, are nowadays overwhelmingly filled with the results of research. It is in the step of assimilation and utilization of the results where the big gap occurs. Mere publication does not insure utilization. One might apply the admonition, 'Ye know these things, blessed are ye if ye do them'."

To Exchange Information

He went on to say that besides the published facts there is another reservoir of information which consists of the little tricks and kinks of saving of labor and materials, or for improvement in quality, that have been worked out in individual plants but never get recorded in technical literature. Swapping information and experience, while extremely logical in theory, is none too easy in accomplishment.

Dr. Gillett then related the various means employed in the United States by which information and data can be disseminated to all those who can make practical use of it. He mentioned the useful work effected by sales engineers, and stressed the importance of the results obtained through smaller organizations.

Dr. Gillett ended his address by saying that "in developing new, fundamental information, the greater the number of co-operators and

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financial supporters the better, but in applying new or old information there seems much virtue in quite small groups, small enough to allow intensive effort. American experience with small groups is so encouraging that it has seemed in order, in discussing teamwork in general, to stress, especially in respect to the foundry industry, the apparent suitability of that 'team spirit' which Mr. Williams aptly characterized as vital for progress."

The lecture was followed by a technical supplement, "Cupola Blast Control", by S. A. Herres, formerly research associate, Battelle Memorial Institute, now Lieutenant — Engineering Corps, U. S. Army, and C. H. Lorig, supervisor, Foundry Department, Battelle Memorial Institute.

In proposing a vote of thanks to Dr. Gillett for his lecture, Vincent Delport, European representative of THE FOUNDRY drew special attention to the intense feelings of friendship that existed between members of the American Foundrymen's Association and their colleagues in Great Britain. He pointed out that, in the light of present circumstances, Dr. Gillett had had a most happy thought in choosing for his lecture the subject of teamwork which could be extended not only to the foundries but also to the larger and more dramatic field of winning the war. He laid stress on the necessity of the team spirit between the people of the United States and Great Britain to continue after the war in order to ensure permanent peace.

The vote of thanks was seconded by Dr. G. L. Bailey, British Non-Ferrous Metals Research Association, who said that Dr. Gillett was to be specially thanked for devoting what must have been a considerable amount of time and thought to preparing this lecture under the stress of present war conditions which were now shared between the Americans and the British. The vote of thanks was received with acclamation and was also extended to J. G. Pearce for the able manner in which he presented the lecture.

Describe Steel Practice

Papers presented to the meeting were discussed concurrently at two different sessions. The first paper in the session dealing with steel and cast iron was "Production of Uniform Steel for a Light Castings Foundry", by C. H. Kain, director, and L. W. Sanders, metallurgist, of Lake & Elliott, Ltd. In this paper the authors give a description of a routine which has been developed to produce liquid steel at the periods when it is most required in a light castings foundry. Two processes are used, the basic electric and the tropenas converter. The authors lay stress on the standardized charging and working in the electric furnace, and on a special technique employed in the cupola supplying iron for the converter.

It is claimed that by the employment of these methods, loss of production caused by the pouring floor waiting for the furnace, or vice versa, is eliminated. The foundry in which these methods are being employed produces from 95 to 100 tons of finished carbon steel castings weekly, which is just double the output for which the plant, which it is stressed is not of the most modern type, was designed originally. A typical week's output was made up of over 5000 castings totaling 97 tons.

The discussion was opened by A. G. Robiette, Birmingham Electric Furnace, Ltd., who said that the practice described by the authors was extremely good, particularly in spite of the fact that it was applied to rather obsolete equipment. He said that if this practice was compared with American practice where the latest type of equipment is used, the time cycles operated in America were nearly half of the time cycle described in the paper, although the

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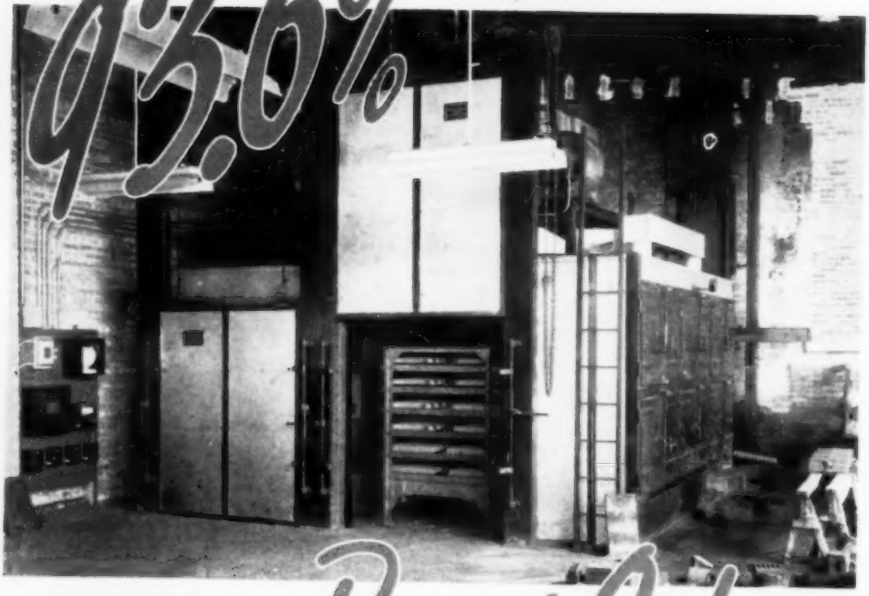

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refining time was approximately the same.

Mr. Kain replying, said that the equipment in the foundry described in the paper was admittedly obsolete and the authors did not claim that their practice was optimum from the modern point of view, but their object was to achieve standardization with the plant that they had at their disposal, and the most important thing was to obtain steel at stated intervals with clockwork regularity. Referring to a remark made by Mr. Robiette on the subject of refractories, Mr. Kain said that the walls and roof of the furnace were built of silica brick and the life was 150 heats. The hearth was made up of dolomite bonded with tar, and the consumption was about 43 pounds per ton of castings, including dolomite rammed into the hearth and that used for fettling during the run of the furnace. By far the larger proportion of this amount was used for repairing the hearth.

Make Steel in Converter

J. J. Sheehan, Coneygre Foundry, Ltd., then brought up the question of converter practice. He stressed the fact that making steel castings was no more an art but definitely a scientific process, and he queried why the authors started blowing with a pressure of 4 pounds per square inch, gradually reducing it to a lower figure. He said that a uniform pressure of 2½ pounds should be sufficient. He pointed out that no reference was made to the amount of air put into the converter, and he would like to know the amount of air put into a particular melt and the time taken to get a melt.

He agreed entirely with the amount of carbon and silicon given in the composition of the iron, but did not see the necessity for the addition of hematite as indicated by the authors. He saw no good reason why 100 per cent steel should not be used. He also could see no reason why batch melting was used in the cupola instead of continuous melting.

Replying, Mr. Kain agreed with Mr. Sheehan that steelmaking was a precision operation, and pointed out that the method described in the paper was adopted quite definitely with the object of arriving at such precision. He said that the blast pressure had been reduced from 4 pounds to 3 pounds because, with the size of the vessel and the depth of the bath, it had been found that if full pressure was maintained they got rather excessive slopping and slag through the nose without any increase in the speed of production.

It was impossible to reduce pressure below 3 pounds because the slag would be thrown back if there was a sudden drop in the flame, and the blast was used to keep the flame steady and constant. Referring to the fact that the converters weighed only about 4½ tons and they got about 91 tons of steel per week from this converter, the vessels were rather small for the output obtained. Mr. Kain explained that they did not use batch melting in the cupola; they melted continuously, but they altered the charges to the cupola so that the resulting charges to the converter were cleared at the end of the day.

He said that the converting time for the vessel was practically constant between 20 to 22 minutes. They were now blowing 16 complete heats in 8 hours from start to finish, which included all handling and removal from the vessel. He regretted that at the present time there were no means of giving accurate figures relative to the volume of air going into the vessel. They had found it was very important that the tuyeres should be made very accurately and precisely located, and they had made a very elaborate jig to insure that the tuyeres were at the specified angle.

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Referring to Mr. Sheehan's remark about using 100 per cent steel, Mr. Kain said that at the commencement of the war they seriously considered going on to 100 per cent steel scrap with additions of silicon to make up the composition of the charge. Owing to the circumstances of the time, they decided to adhere to the old practice of using 70 per cent scrap and 30 per cent hematite as they found it was the more economical method. In the past they had found that 100 per cent steel mix gave trouble with the cupola owing to wear and erosion of the lining and necessity for disposing of the large volume of slag.

Mr. Sheehan then said that there should be no difficulty experienced with 100 per cent steel as compared with 70 per cent. He also said that the time of the blow could be reduced to 12 minutes instead of 22, particularly if the silicon content was reduced from 1.5 per cent to 1.0 or 1.2 per cent.

C. D. Cooper related the results of some of his experiences over a period of years, during which he had dealt with all kinds of cupolas and converters ranging in size from ¼ to 50 tons. He did not agree that 100 per cent steel charge was advisable, and said that although it was possible it was not profitable. Referring to blowing the converter, he said that the main point was to get the converter on the boil, and it was his opinion that if it was desired to get a really good steel from the tropenas converter, pressure should be started at about 3 pounds and then dropped down to 2 pounds. He also said that for good solid practice he would like to keep up the silicon to 1.5, even running up to 2 per cent.

J. Gardom, chairman of the technical committee of the institute, emphasized the fact that the authors of the paper had succeeded with the plant at their disposal in doubling the output, and he commended them upon the results they had obtained. Daniel Sharpe confirmed Mr. Gardom's remarks.

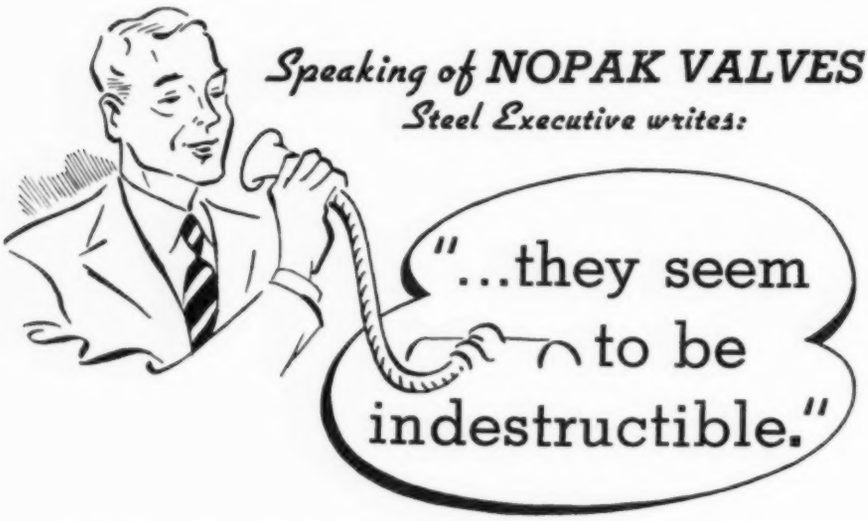
Mr. Kain, replying to some of Mr. Cooper's remarks, said that provided steel was properly made, the difference in life, fluidity, etc., between electric and converter steel was very little. He did say that it had been shown that converter steel was about 60 degrees hotter than electric steel.

American Exchange Paper

The next paper was the American Exchange Paper by Carl F. Joseph, research metallurgist, Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich., whose subject was "ArmaSteel—Its Manufacture, Control and Applications". The author described the development of ArmaSteel in the United States. He referred to the conditions required to control the product, gave a brief description of the manufacturing process, discussed the graphite size as influenced by pig iron, and after dealing with various metallurgical aspects of the process, he mentioned the advantages obtained with this metal from the point of view of machinability. The paper was presented by A. E. Peace, convener of the malleable cast iron subcommittee of the institute.

G. R. Webster opened the discussion by asking if there was any particular advantage in performing the oil hardening and tempering during the heat treatment cycle. He had in mind that if a high degree of hardening was required it might be profitable to harden fully first and then to anneal. He also inquired about the composition of the metal, expressing the opinion that the silicon content would have a very potent effect on the hardness and other characteristics obtained. He also inquired after the effect of alloy additions, particularly molybdenum.

Mr. Peace replied that with regard



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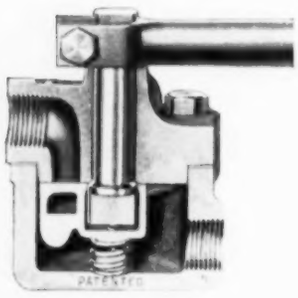

Cross-Sectional View, NOPAK 3- and 4-Way Valve. Simple design, rugged construction, *packless* assembly, and the famous NOPAK Bridged-Disc Principle make NOPAK Valves leakproof and wear-proof. Perfectly lapped, leakproof sealing surfaces of disc and seat improve with use . . . are constantly shielded from grit abrasion.

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to the question of hardening as a separate operation from the annealing process, it could be said that the material referred to in the paper was only one of several types of pearlitic malleable that were being produced. Actually there were something well over 12 different types of pearlitic malleable produced by different people, and each one had his own ideas about it. He himself had been producing pearlitic malleable for about 10 years and had carried out the normal black heart annealing treatment and then reheated the material for hardening. As regards variation in composition, he said that the important thing to consider was the necessity that the relative proportions of carbon, silicon, manganese, etc., should be such as would not favor primary graphitization.

He also stated it was necessary to work as near the borderline as possible, which necessitated that there should be little latitude in the composition. As regards carbon content, one would not work to a variation that would exceed a total range of 0.3 per cent and in silicon content much closer than that. With regard to alloy additions, he said that they fell mainly into two classes, those which favored graphitizing and those which stabilized carbon. Molybdenum was a mild carbide stabilizer, and if it were used it would be necessary to increase the silicon content.

The next paper was entitled "Substituting of High-Duty Gray Iron for Steel Castings", by J. Blakiston of Modern Foundries, Ltd. In this paper the author desired to stress what advantages the engineers had gained by the revolutionary developments brought about in the cast iron industry by the development of high duty gray iron, and he cited a number of examples of engineering parts and machine parts which can now be made in high duty cast iron with all guarantees of reliability.

The discussion was opened by Dr. A. Everest, Mond Nickel Co., who referred to the difficulty of attaching tungsten carbide tips to cast iron shanks. He said that a lot of trouble had been caused by people trying to cast on the tips by the electric welder and he stated that cast iron was not suited for the purpose.

P. A. Russell, convener of the cast iron subcommittee of the institute, referred to the classification adopted in Great Britain which distinguished high duty cast irons as between Grades 1-2-3-4 standards. He agreed that the methods set out in the paper were excellent for working up to Grades 3 and 4, but he could not agree that it was necessary to use 50 per cent steel charges followed by inoculation to meet Grade 1, and that it was hardly necessary to do so to meet Grade 2. He went on to say that it was hardly justifiable to include Grade 1 in the high duty specification, and it would be better to include it in the ordinary gray iron classification.

The second session of the papers included "Reports on Low Tin and Tin-free Bronzes and Brasses" by the members of the nonferrous subcommittee of the technical committee of the institute, and a paper on the "Properties of Low Tin Content, Gunmetals and Brasses", by F. Hudson, The Mond Nickel Co., Ltd.

Vacuum Cleaner

Breuer Electric Mfg. Co., 5100 North Ravenswood avenue, Chicago, has introduced a new vacuum cleaner which is claimed to be especially suitable for continuous heavy duty operation. High speed operation develops suction strength to pick up welding flux, scrap, heavy particles of dirt, water and other forms of debris. Absence of commutator or carbon brushes it is claimed prolongs life while operating continuously at high speed. The motor operates on 220 volt, 180 cycle current.

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New WPB Specifications on Heat Resistant Steel

TO CONSERVE nickel and chromium, WPB has set up specifications for heat resistant alloy steel for various uses. They are designed to use the least possible amount of alloying materials necessary to maintain the effectiveness of the equipment involved.

The order M-21-g went into effect July 2. Applications of the material affected by the order include metallurgical furnaces, oil refineries, synthetic rubber plants, cement mill furnaces and power plant equipment.

Excepted from the order provisions are requirements for the armed services when different specifications are called for; also materials already fully fabricated and materials under contract where it would be impractical to change specifications, provided delivery is made within 60 days. Materials and restrictions follow in schedule A:

SCHEDULE A

Restrictions on Certain Uses of Chromium-Nickel Iron and Steel Alloys for Heat Resistant Purposes.

Part I. Parts for or Equipment Used in, Industrial, Heat Treating, or Other Metallurgical Furnaces.

Analysis A: No Cr, no Ni. uses:

1. For all uses where temperatures are below 900° F.

2 For non-integral furnace parts and accessories, operating at temperatures between 900° F. and 1200° F.

3 For pots for molten baths, such as lead or salts, operating at temperatures below 1400° F.

Analysis B: 6% Cr, no Ni. uses:

1. For integral furnace parts and those mechanical parts subject to substantially uniform heating and mechanical loading, operating at temperatures between 900° F. and 1200° F.

2. For non-integral furnace parts and accessories not subject to frequently repeated severe thermal shock, operating at temperatures between 1200° F. and 1400° F.

Analysis C: 18% Cr, 8% Ni. uses:

1. For integral furnace parts and those mechanical parts subject to substantially uniform heating and mechanical loading, operating at temperatures between 1200° F. and 1400° F.

2. For operating parts which allow substantial latitude in design, such as walking beam rails, roller rails, rotating shafts and slide rails, operating at temperatures between 900° F. and 1200°F.

Analysis E: 25% Cr, 12% Ni. uses:

1. For both integral and non-integral furnace parts and accessories not subject to severe thermal shock or abnormal load, operating at temperatures between 1400° F. and 1900° F.

2. For fuel fired radiant tube heating elements.

3. For operating parts which allow substantial latitude in design, such as walking beam rails, roller rails, rotating shafts and slide rails, operating at temperatures above 1200° F.

4. Retorts for Magnesium.

Analysis G: 15% Cr, 35% Ni; or 27% Cr, 4% Ni. uses:

1. For parts which must of necessity endure highly concentrated stress because of the nature of the mechanism, such as link conveyors, mesh belts, chain conveyors, shaker hearths, hot bearings and fan

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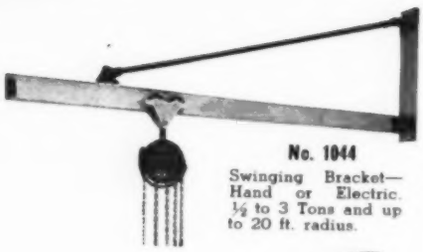
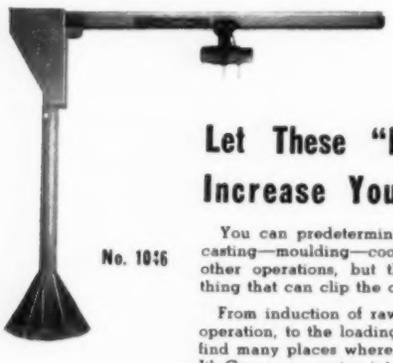
★ You will establish top efficiency—save man-hours—eliminate needless operations—reduce employee fatigue and promote real safety, when you spot and use these Jib Type Cranes at strategic points in your foundry.



No. 1044
Swinging Bracket—Hand or Electric. ½ to 3 Tons and up to 20 ft. radius.



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No. 1046A

Let These "Mechanical Muscles" Increase Your Foundry Output

You can predetermine the time required for heating—casting—moulding—cooling—cleaning—inspection and other operations, but the "in-between" handling is the thing that can clip the cost sheet.

From induction of raw materials, through each foundry operation, to the loading of the finished product, you will find many places where these Pillar, Mast and Wall Type Jib Cranes can swing into action for greater foundry output.

WE URGE YOU—Ask us to send our latest circular showing the new and improved line of Chicago Tramrail Jib Mounted (Electric or hand-operated) Cranes. Make a quick survey of your present handling operations, and you'll be quick to locate production gaps that this equipment will span for more speedy operation.

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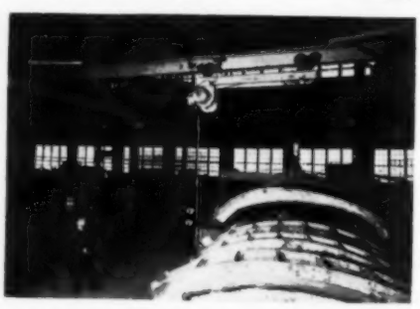

Chicago Tramrail Furnace Crane at Work

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wheels, operating at temperatures above 900° F.

2. For parts subject to thermal shock or abnormal load, operating at temperatures above 1200° F.

3. For parts subject to chemical attack or electrolytic action, such as carburizing and "dry cyaniding."

4. For parts, such as quenching fixtures and hearth plates, where it can be shown that scaling can not be avoided which would result in serious difficulties.

5. For pots for molten baths, such as lead or salts, operating at temperatures above 1400° F.

6. For furnace parts and accessories, operating at temperatures above 1900° F.

Analysis H: 15% Cr, 65% Ni. use:

1. For electrical heating elements where the operating temperature of the element is below 1200° F.

Part II. Parts for, or Equipment Used in, Oil Refineries, Synthetic Rubber Plants, and Cement Mill Furnaces.

Analysis A: No Cr, no Ni. uses:

1. For all uses, operating at temperatures below 900° F.

Analysis B: 6% Cr, no Ni. uses:

1. For all uses, operating at temperatures between 900° F. and 1400° F.

Analysis C: 18% Cr, 8% Ni. uses:

1. For all uses, operating at temperatures between 1400° F. and 1600° F.

Analysis E: 25% Cr, 12% Ni. uses:

1. For all uses, operating at temperatures above 1600° F.

Part III. Parts for Power Plant Equipment.

Analysis A: No Cr, no Ni. uses:

1. For Economizer Supports and Sleeves.

2. For Boiler Dampers.

3. For all Stoker Parts.

4. For Soot Blowers, operating at temperatures below 1600° F.

5. For Seal Plates, Wall Castings and Door Liners.

6. Tubing for Feed Water Heaters.

Analysis C: 18% Cr, 8% Ni. uses:

1. For that part of chemical feed pipe connections inside the boiler drum.

Analysis D: 27% Cr, 9% Ni. uses:

1. For Soot Blowers, operating at temperatures above 1600° F.

Analysis E: 25% Cr, 12% Ni. uses:

1. For Super-Heater Supports, Clamps and Baffles, operating at temperatures between 1300° F. and 1600° F.

2. For Boiler non-pressure parts exposed to direct furnace temperatures of over 1600° F.

Analysis F: 25% Cr, 20% Ni. uses:

1. For Super-Heater Supports, Clamps and Baffles, operating at temperatures above 1600° F.

2. For Fuel Burners—Oil, Gas and Coal, where parts are directly exposed to furnace temperatures.

Analysis H: 15% Cr, 65% Ni. uses:

1. For Fuel Burner Impeller Plates ⅛-inch in thickness.

Note: With the exception of Analysis A, an addition of 2% in content of Chromium and 2% in content of Nickel in the Analysis designated in this Schedule A is permissible to allow for the use of scrap and for variations in melting and laboratory procedures. For example: In the case of Analysis C (18% Cr.—8% Ni.) up to 20% Chromium and 10% Nickel is permissible.

Issues Specifications

Federal government recently has issued Amendment No. 1 to specification QQ-B-691a on bronze castings containing several changes of importance. New tables for chemical compositions and physical properties of the various alloys are included. New emergency federal specifications for copper-silicon alloy castings E-QQ-C-593, and for aluminum bronze castings E-QQ-B-671a call attention to various alternate materials which might be used to conserve some or all of the nonferrous materials involved.

GET FULL UNIFORM MELTS

This typical "R-C" Cupola Blower installation is a "repeat" order for one of the leading manufacturers of fine machine tools.

Here's an important advantage of Roots-Connersville Cupola Blowers. The required volume of air is delivered constantly—unaffected by variable resistance within your cupola. This characteristic aids in securing full, uniform melts—and with less power consumption than by any other type of blower. *Positive Displacement* design is the reason.

As Victory depends on *first* things coming FIRST, some delivery dates have necessarily lengthened and should govern your consideration now of future needs.

All Out for Victory

Roots Connersville Since 1854 Positive Displacement CUPOLA BLOWERS

ROOTS-CONNERSVILLE BLOWER CORP.

208 MADISON AVENUE CONNERSVILLE, INDIANA

PROTECTING LIFE PROPERTY AND PRODUCTION

(*Continued from page* 67)

a combination of the primary colors. It is possible to use different colors on various parts of equipment or structures so that the color scheme will identify each part. For instance, a fire or sprinkler valve can be of red color and the like. Moving parts of machinery can be colored with characteristic colors to denote the moving and stationary elements.

Where it is essential to operate certain moving machinery or equipment during a blackout such as cranes, elevators, conveyors and the like, use of black light will permit such operations to continue within the limitations of the conditions.

(1) *Cranes.* If a bridge or gantry crane must be operated out of doors during a blackout, the crane supporting girders can be painted a certain color and made fluorescent with lamps suspended from the crane bridge and directed at the crane girders.

The magnet or bucket suspended from the crane can be painted a color and made to fluoresce by a black light lamp suspended so as to excite the object at all times.

If the crane is working on materials in storage bins the outlines of the bins can be painted so that they will be visible to the crane operator, provided they can be covered with the rays of a black light flood lamp. Fluorescent painted strips can be laid on top of rail car sides to indicate the outline of the car. Various control handles in the cab of the crane can be identified by characteristic colors, energized by black light so that the operator will know which controls to operate.

(2) *Elevators.* Aisle spaces leading to elevators may be outlined by painted markers energized by black light lamps. Entrance to gates and elevators as well as to floor levels in the interior shafts may be indicated by black light lamps.

(3) *Roadway Markings.* Roadway markings, traffic signals and the like can be well defined by the application of colors and lamps.

Further information and the supplies for black light can be obtained from any of the reputable electric lamp companies or from any of the heavy industrial chemical companies. Parts and objects that have been painted with fluorescent coatings can be excited by portable flashlights equipped with black light bulbs.

(4) Ordinary white paint can also be used effectively to delineate obstacles and pathways.

(P)—*Electric Power and Light Circuits.*

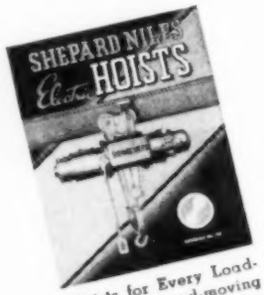
(1)—*Centralized Control.* It would, of course, be an ideal situation if all electric power and light circuits could be controlled from one centralized point such as from the office of the plant defense coordinator. This method is too expensive as a rule to install in an existing property.

(2)—*Plants not Working During Night Hours.* If a plant does not work during the night hours or

Overhead Load Handling
WITH LIFTABOUT ELECTRIC HOISTS

A battery of Close Clearance Liftabouts helps to maintain maximum production in this axle department.

Planned overhead load-handling with Liftabout hoists! That's the profitable way to meet production schedules. Liftabout hoists are playing an important part in speeding up production in every industry. Powered by heavy duty motors, designed especially for crane and hoist service—"Balanced Drive" heat treated gearing—antifriction bearings—automatic oil bath lubrication and precision control, are features that keep the Liftabout young, and everlastingly on the job.



"Hoists for Every Load-lifting and Load-moving Need" aptly describes this 48-page Catalog No. 127. Send for your copy today.

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A COMPLETE LINE OF CRANES & HOISTS
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if there is a portion of the plant that can be segregated and is not working during the night hours or has no regular occupancy, the main power and light circuits should be switched off providing such power and light circuits do not feed installations of air compressor, fire or service pumps or some other strategic facilities necessary for the defense or operation of the plant or for the emergency lighting service. By so doing the chances of electrical fires, shocks and electrocutions are greatly minimized in case of trouble.

(3)—*Plants Working During a Blackout.* Plants or sections of plants that work during the night hours should go over all electric power and lighting circuits carefully to make sure that they are in good order. Also properly mark control switches for all areas so that in case of trouble only the area involved will be cut off if necessary.

This is important because many metallurgical, heat treating, normalizing, annealing and other processes must be kept operating so that the equipment or material being processed will not be destroyed or badly damaged by power failure. Power must also be kept on certain ventilating systems exhausting dust, gas, fumes or vapors that might be hazardous to life or cause damage to the property.

(4)—*Emergency Battery Lighting.* Main telephone switchboard serving the plant, the plant defense coordinator's office and any dispensary or first-aid unit in the plant should be provided with emergency battery lighting sets to be used in case of failure of the regular electrical systems. Extra bulbs and sockets should be provided in case of bulb failure.

(Q)—*Smoke Screens for Hiding Purposes.*

(1)—*Use.* If it is felt necessary to hide portions or all of the property from view above, a reasonably good job can be done with smudge pots, but the efficiency of smudge pots depends somewhat on the wind velocity and weather conditions. Smoke screens are more effective when covering large areas, for instance, if a company were to attempt to provide a smoke screen over a single plant, this would be a good indication of where the plant is located. Smoke screens are more effective if they cover considerable of the surrounding area adjacent to the plant.

Plants operating metallurgical equipment such as cupolas, reverberatory furnaces and the like, can produce a great deal of smoke with equipment of this type that will help in developing a smoke screen over a considerable area. Even railroad locomotives on tracks adjacent to the plant can aid in producing dense smoke that will help in the protection of the plant.

(2)—*Large Smudge Pots.* Large smudge pots designed for giving off great volumes of smoke can be constructed as shown in Fig. 6. Pots usually are set on the ground around the property and in the interior of the property if the area is large. Pots are usually set on about 50-foot centers around the property line or area to be smudged out. Trials should be made to determine the best arrangements.

This large type of smudge pot is most effective when coal tar is used, although it will work with considerable success with any heavy low volatile tarry liquid fuel. The pan is filled to not over 6 inches with coal tar. If filled any higher the pan would boil over and flames would appear outside the pot. A piece of ignited oily waste will set the tar burning. These pots can be rigged up so that a whole series of them

6' 0" x 10' 00"
Capacity 10 Tons

There'll be STEADIER SCHEDULES in PLANT PRODUCTION

now that this Robins Shakeout is installed

A certain plant in a midwestern city is going to maintain a more constant flow of production from now on . . . a weak point in the production line has been eliminated. Instead of the outmoded type of shakeout where the load is carried by bearings, a Robins Full-Floating Shakeout has been installed . . . instead of an inherently weak device, a soundly-engineered mechanical aid is in operation.

In the Robins Shakeout there is no eccentric shaft with fixed main bearings vulnerable to failure through impact and overloads; there are no rigid bearings to withstand the impact of careless loading or accidental dropping of the 10,000 lb. flask. Instead, an unbalanced pulley principle is employed, with the entire load supported on coil springs . . . cushioning the weight . . . making it full-floating.

Another safety feature is the complete absence of extensions and protruding parts . . . nothing that could trip workmen or tear their clothes. Less floor space is required, too.

There'll be steadier schedules in plant production—now that this Robins Shakeout is installed. Robins engineers have solved another problem in the all-out effort to win this war.

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PASSAIC, N. J.

can be ignited electrically. One filling of the pan will last about an hour with heavy fuels. Extra pots should be on hand so that staggered firing can be arranged for and thus they will not all go out at the same time. If the wind is strong a few short boards can be laid against the air space at the base of the chimney to shut off some of the draft.

(3)—*Small Smudge Pots.* Where it is not possible to obtain a supply of tar oil or where it is desired to use smoke pots on some portions of the roof or an elevation of a property such as around steam exhaust stacks, a much smaller pot can be used effectively, as shown in Fig. 7.

This pot is constructed of old steel barrels or drums and has the advantage that lighter gravity fuel oils can be used and yet produce a dense cloud of smoke. The smoke produced in this pot with the lighter fuels does not contain the heavy particles of soot that are given off by the large size smudge pots using coal tar. Due to the finer divided carbon particles in the smoke emanating from the smaller type of smudge pot, the carrying distance of the smoke is somewhat greater.

This type of pot will burn fuel oils up to about 22 degree Baume. The pot is filled with five gallons of oil and one charge of oil lasts about one hour. This pot can be refilled with fuel by using a gooseneck pipe connection inserted through the 2-inch fill plug inside the upper barrel and then the plug replaced.

(R)—*Hazards of Blackouts.* Plant property should be guarded carefully during a blackout or bomb raid. This requires that the property lines be well patrolled and all important and strategic areas, such as engine and boiler rooms, substations, pump houses and other areas of like importance, be placed under guard immediately.

When emergency low intensity lighting is resorted to within the building, the occupants should be evacuated to predesignated places and kept there. Guards and patrols should be put into the evacuated areas to watch over the machines, equipment and strategic areas.

Acts of sabotage can be committed throughout the plant when confusion occurs, hence the necessity of complete guarding of the whole property.

Suspected personnel should be watched at all times during such emergencies.

Be sure that all properties adjacent to your property lines cooperate and are also blacked out so that your property is not conspicuous by the absence of lights.

Do not allow employes and others out of doors during an emergency except those that have regular assignments. Dangers from shell and bomb splinters are great and falling debris may cause accidents.

(S)—*Vehicles Operating Within Plants.* No self-propelled vehicles should be operated within the plant during an emergency period except fire emergency trucks and ambulances. All vehicles not permitted to operate shall be parked as far away from buildings as possible and not obstruct the plant roadways and fire plugs.

Ignition keys shall be kept in the vehicles in case it is necessary to move them. Vehicles required to operate during blackouts shall have head and tail lights conforming to recommendations of the Office of Civilian Defense.

(T)—*Flashlights.* If it is necessary to use flashlights out of doors or in buildings in which the glazed areas are not covered during a blackout, the cover glasses on flashlights should be provided with two thicknesses of newspaper between the glass and the bulb to dull the light.

Flashlights should be held so the beam points down and never

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Whisk them through the Foundry;

Zip them through the Cleaning Room.

Use the following to shorten long jobs and eliminate unnecessary ones.

LION BINDER - A strong, fast drying paste; tie wires not needed. A strong binder that bakes very fast.

EASY CLEANER CORE COMPOUND - Makes cores that clean out of the castings readily.

VULCAN BLACKING - Can be adapted to swift application; gives good surface, cleans speedily.

DUST-ON FACING - Shake it on green sand molds, close and pour. No tooling. Fast cleaning.

SUPERIOR PLUMBAGO - Rubs in immediately; doesn't "lift" the sand - - peels beautifully.

SILKOTE - Paint or spray on steel foundry cores, dry sand molds and skin dried work. Adaptable to fast application. Casting surfaces are really clean.

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pointed straight ahead or upward.

(U)—*Outside Fires.* During a blackout all outside bonfires, rubbish fires and the like should be immediately extinguished.

Red hot slag or other material that will give off a light should be covered or removed inside immediately, or otherwise effectively handled so that no light will be visible from above.

SECTION X—MISCELLANEOUS

(A)—*Valuable Records.* Experiences in Europe have indicated that all valuable official and permanent records should be photographed on micro film and this film buried or put in a vault in some other location in the city or country, to be available in case the original plant records are destroyed. Photostating of records also provides a good means of duplicating records.

In case of air or bomb raid warning signals being issued, the personnel using valuable records and the like should be instructed to return such records to places of safekeeping immediately, preferably fireproof vaults or safes.

(B)—*Military Drawings, Blue Prints and Correspondence.* Extreme care should be exercised in distributing drawings, blue prints, specifications and correspondence of a military nature. Personnel having to do with items of this character should be cautioned not to leave such information around in a careless manner, and such information should be kept under lock and key as much as possible, particularly when not in use; for instance, after working hours.

(C)—*Gangways, Aisles and Roadways.* It is very important that aisles and gangways in buildings and roadways through the plant be kept free of obstructions and unnecessary material at all times to facilitate passage of employes in cases of emergency, particularly under conditions of emergency lighting.

Roadways through the plant should be kept open at all times so that fire-fighting equipment may get around the plant unhampered; also so that ambulance service may reach as many parts of the plant as possible.

(D)—*Advertising Signs.*

(1) *Electric Signs.* Electrically lighted advertising signs many times are operated under a separate contract with the utility company or a sign company and the utility company or sign company only has a key to the operating switch. In such cases, arrangement should be made so that the plant can turn out the signs during blackouts.

It is recommended that during the period of the war, electric advertising signs on plant properties be shut off so as to remove the problem of turning them off for an emergency, and also conserve electric energy for essential needs.

(2) *Other Identification Signs.* Advertising signs, company names and trade-marks painted on the roofs of buildings or prominently displayed on the ground so as to be distinguished from above should be removed to minimize the number of telltale landmarks.

Advertising signs, names and trade-marks on the sides of building walls or on sign boards or even the name on the door or entrance to a plant should be made as inconspicuous as possible; or should be entirely removed for the duration of the war so as not to serve as a guide to fifth columnists not familiar with the neighborhood.

(E)—*Coal Storage.* All coal deliveries, either by truck or railroad car, should be inspected carefully for bombs and sticks of dynamite as they are unloaded.

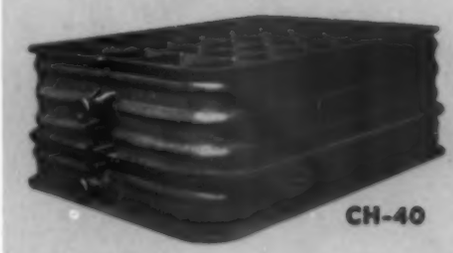
(F)—*Drills and Inspection.* Every plant should conduct drills or rehearsals to make sure that everyone assigned to duties in connection with blackouts or air raids is thor-

A TRUSCON STEEL FLASK

FOR EVERY FOUNDRY NEED!

OM-1

TM-10



CH-40

● Truscon Foundry Flasks are designed and built to meet the particular requirements of all types of foundries. Light weight . . . durability . . . strength where strength is needed . . . easily rammed and shaken out . . . these are famous Truscon features.

OM-1. A light, one-man flask, with single bearing combination welded handles and pin lugs. For ease of molding and handling on bench work.

TM-10. Equipped with single bearing welded pin lugs. The end welded two-man handles provide for easy handling of units.

CH-40. An extremely large flask for extra heavy duty. Intricate barring arrangement, double bearing welded pin lugs on cope, single bearing welded pin lugs on drag. Extra heavy duty trunnions securely welded to flask.

Write for illustrated catalog and ask us to study your flask problem.

TRUSCON STEEL BOXES AND SKID PLATFORMS permit the *efficient* storage of material, and *efficient* movement to production lines. Extremely durable and long-lived. May we study *your* material-handling problem?

Truscon Steel Company, Pressed Steel Division, 6100 Truscon Ave., Cleveland, O. Subsidiary of Republic Steel Corporation.

TRUSCON FOUNDRY FLASKS

oughly conversant with his particular assignment and that the balance of the employes go through their routine as required.

Drills and inspections should be made until the management is satisfied that every situation is covered and provided for, not only for its own protection but for the protection of the community and neighbors.

(G)—*Walls for Protective Purposes.* Twelve inch walls of reinforced concrete or brick can be used to reinforce the protection of certain buildings and strategic equipment. If sand bags are used, they should be filled up three-quarters full and the bag opening either sewed or turned under. They should be set on a substantial, dry base and should be laid in alternate courses of header and stretchers. The base should be at least two bag-lengths thick.

(H)—*Blackout and Air Raid Warning Signals.* Plants should establish liaison with the local defense authorities and arrange a system of warning signals to be used in case of blackouts or air raid. These signals should conform with the kind of signals being used in the local community so that there is no chance for confusion or misunderstanding of signals. Whistles, sirens, bells or other means of warning should be employed. It may be desired to establish a plant alarm to follow the general air raid alarm to show the plant may be attacked.

(I)—*Protection of Hazardous Fuel-Fired Furnaces.* Gas or oil-fired furnaces and ovens, particularly those operating at lower temperatures, and all such equipment operating without automatic combustion safeguards should have all control valves shut off tight at once in the event of a failure of fuel or power supply. This is necessary to prevent possibilities of disastrous explosions in the event the fuel or electric supply is re-established.

It is recommended that all oven and similar equipment be safeguarded as follows: All gaseous and oil fired ladle, core, blacking, annealing and other types of ovens of more than 200 cubic foot internal volume should be provided with means for thoroughly purging all internal parts of the oven of combustible gas pockets before the burners can be lighted. Such purging should be equivalent to at least four complete fresh air changes and should not be construed to mean recirculation.

All ovens of 200 cubic foot internal volume or less and not equipped to be thoroughly purged before the burners can be lighted should be so designed that the oven doors must be opened to light the burner equipment. Where oven purging is dependent on opening of doors, the doors should be fully opened for 5 minutes before lighting the burners. Large fans may be employed in blowing out ovens before lighting to remove gas pockets.

All ovens should be equipped with combustion safeguards that prevent unburned fuel discharging from burners into the ovens in the event of flame failure. Such combustion safeguards should be of the quick-acting type on ovens of more than 200 cubic-foot internal volume.

Explosion vents in the ratio of 1 square foot of vent area for 15 cubic feet of oven volume should be provided. These vents should be in the form of doors held closely by means of friction latches or loose top panels.

Printed instructions for the routine to follow in lighting ovens should be plainly posted at the burner equipment.

(J)—*Master Key Systems.* If master key systems having to do with locks to important records, files, offices, substations, power and boiler houses, gates, entrances and the like have been in effect for some time in the plant, it is advisable to change the key system and only give out new keys to those of the

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- ☐ MILWAUKEE THREAD STEM CHAPLETS
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personnel entitled to have such keys and a permanent record should be kept of all keys so issued.

A check-up of any other keys issued to the plant personnel should be made to determine and record to whom keys have been issued.

SECTION XI—CAMOUFLAGE

(1) *Use.* In areas that may be subjected to aerial bombings, camouflage of buildings, tanks, substations and other strategic items may be resorted to, to hide the general character of the occupancy or use of the property.

(2) *Methods.* Various methods of camouflage may be employed to hide strategic property or to change the appearance of an object.

Roofs of buildings can be painted or otherwise colored, or treated with grass, shrubs and the like to assimilate the general appearance of the surrounding ground area.

False walls and covers can be built on the property so as to confuse the plant's identity from the air. Usually 2 x 4-inch joists covered with slats, canvas or netting can be placed around the object to be camouflaged, and the exterior painted to hide the identity of what is being covered up. Even windows and such items can be painted on for camouflage purposes.

Light weight structures can be built up adjacent to other buildings to change the appearance of the plant entirely from the air, so that the plant will not be identified from the number of buildings actually occupied.

Camouflaging is a new activity as far as industry is concerned and technical information should be obtained from reliable sources for best results, and plans for a plant should be coordinated with the plans for that area.

SECTION XII—BIBLIOGRAPHY

The following list of publications deals generally with the subject matter of the *Code of Recommended Practices*. Some of these are difficult to obtain because of their confidential nature or because the supply is limited. Requests should be addressed to the local or state defense council.

Handbook for Air Raid Wardens
Office of Civilian Defense
U. S. Government Printing Office, Washington.

Air Raid Warning System
Office of Civilian Defense, Washington.

Blackouts
Office of Civilian Defense,
U. S. Government Printing Office, Washington. Price $0.25.

Emergency Medical Services for Civilian Defense
Office of Civilian Defense, Washington.

Handbook for Decontamination Squads
Office of Civilian Defense,
U. S. Government Printing Office, Washington.

Handbook for Demolition and Clearance Crews
Office of Civilian Defense,
U. S. Government Printing Office, Washington.

Fire Protection in Civilian Defense
Office of Civilian Defense, Washington.

Handbook for Fire Watchers
Office of Civilian Defense,
U. S. Government Printing Office, Washington.

Handbook of First Aid
Office of Civilian Defense,
U. S. Government Printing Office, Washington.

Glass and Glass Substitutes
U. S. Government Printing Office, Washington. Price $0.10.

Handbook for Messengers
Office of Civilian Defense,
U. S. Government Printing Office, Washington.

Protection of Industrial Plants and Public Buildings
Office of Civilian Defense, Washington.

Report of Bomb Tests on Material and Structures
Office of Civilian Defense, Washington.

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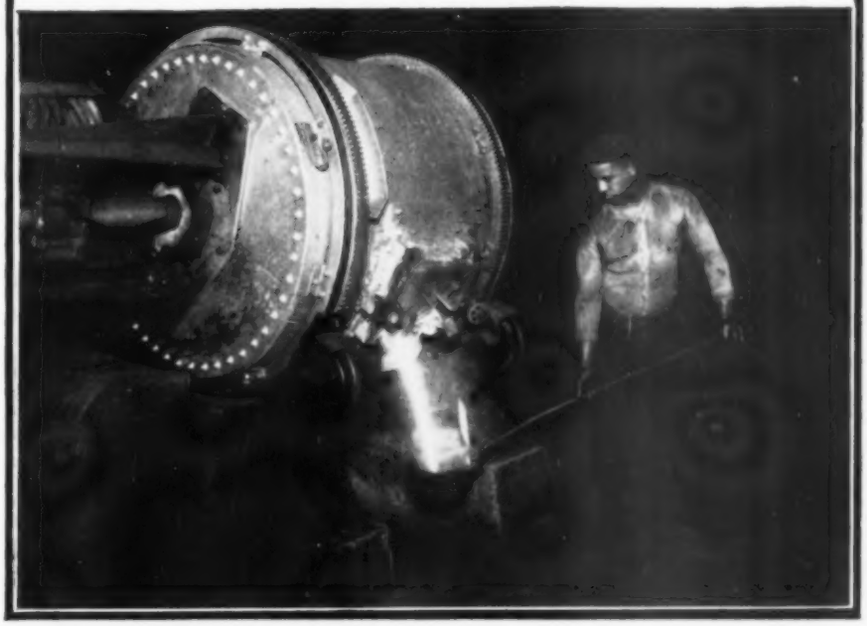
DETROIT ROCKING ELECTRIC FURNACE

1—Faster Melting.
2—Lower Metal Losses.
3—Higher Average Quality of Product.
4—Less Machine Shop Scrap
5—Saving in Floor Space and Molding Equipment.
6—Use of Cheaper Raw Materials.
7—Less Labor.
8—Saving of Alloys.

These are but a few of the many advantages of this remarkable furnace. But don't take our word for these claims—find out for yourself. Let us arrange for you to see a few of these furnaces in operation and talk to their owners yourself. Get the low-down first hand from those who know. Write for further facts today.



DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY MICHIGAN

Handbook for Rescue Squads
Office of Civilian Defense,
U. S. Government Printing Office,
Washington.

Handbook for Road Repair Crews
Office of Civilian Defense,
U. S. Government Printing Office,
Washington.

Training Courses for Civilian Protection
Office of Civilian Defense,
Washington.

Character Concealment
Office of Civilian Defense,
Washington.

Adventures of Bill

(*Concluded from page 88*)

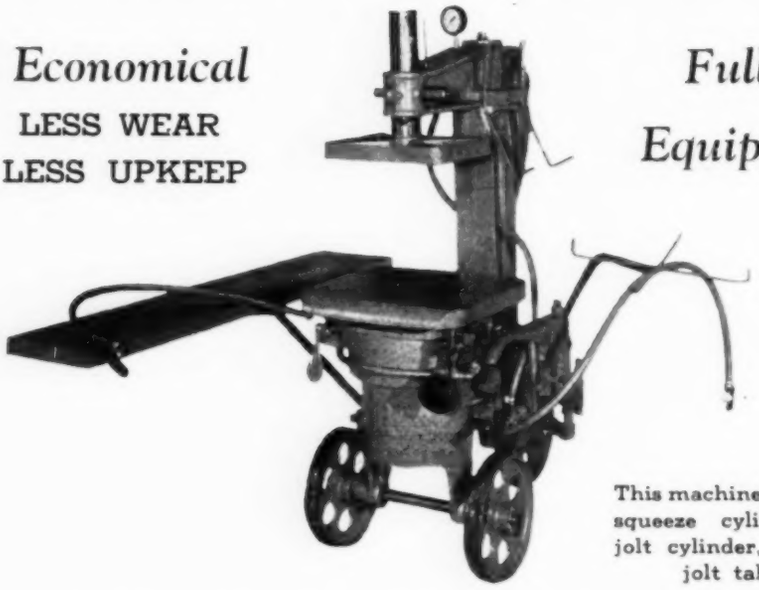
and the mold broke away in a considerable area near the center and spoiled the casting.

"A comparatively narrow body of sand even if dried and reinforced with a row of nails is not strong enough to resist the pressure of metal from a sprue 36 inches high from the top of the pouring basin to the joint of the mold. The fact that three molds out of four withstood the pressure is no proof in face of the further fact that one mold yielded. Forlorn hopes and risky performances occasionally are successful, but never are justified except probably in desperate emergency. In this instance the desperate emergency does not exist. The style of gate outlined would serve to deliver the metal to the mold, but the sand between runner and casting should be reinforced with a stiff plate bolted to the bottom plate or to the ends of the drag and extending upward to the joint. Similarly in the cope the sprue should be encased in a single long bushing, a succession of short bushings, or be protected by a chuck bar in front. Dry sand will resist considerable pressure, but it has limits. The foregoing precautions add a little to the cost of making the mold, but they are cheaper than a lost casting. A better method for gating the casting, better in every respect and a method which eliminates all pressure risks including the risk of metal breaking out at the joint behind the runner, is to build a long basin on top of the cope. Metal from the basin enters the mold through a row of six ¾-inch pop gates set 6 inches apart and in a straight horizontal line about half way between the joint and the top of the mold."

HAYNES JOLT SQUEEZER

Economical
LESS WEAR
LESS UPKEEP

Fully Equipped



This machine has a 10" squeeze cylinder, 3" jolt cylinder, 17 x 20 jolt table.

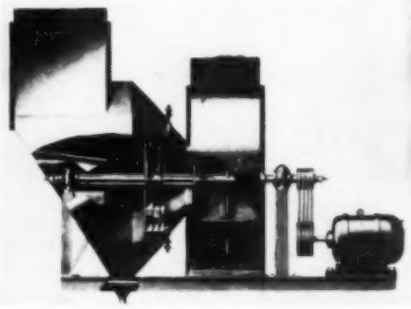
• The post and squeeze cylinder on the HAYNES JOLT SQUEEZER is cast all in one piece. There are no bolts or screws in this machine. The top of the post is machined on top with a 2-7/16" cold rolled shaft which the swing arm swings on.

This is a portable machine with three wheels, two in front, one in back, zerk fittings on all moving parts. Comes equipped with vibrator, riddle rack, set-off board, air gauge, pop-off gauge and a pin on top of the arm for a gate horn.

HAYNES FOUNDRY EQUIPMENT CO.
1734 LAKE STREET KALAMAZOO, MICH.

Filter Fan

Claude B. Schneible Co., 3593 Lawrence avenue, Chicago, has placed on the market a new filter fan, shown in the accompanying illustration, which is designed for removing dust from hot corrosive stack or cupola discharge through a specially designed rejector wheel



Solid particles are thrown out while hot air and gas pass through openings in the rejector and are exhausted by the fan. Units are available in seven sizes up to 26,000 cubic feet per minute and readily can be worked into any stack condition.

Nitralloy Corp., 230 Park avenue, New York, recently has published an interesting and valuable 88-page booklet entitled, "Fatigue of Metals—Some Facts for the Designing Engineer", by D. Laudau.

CARRIES ON EXPERIMENTAL WORK

(*Continued from page* 69)

gate. In others a feeding riser or reservoir does the work. In either case success depends on keeping the line of communication open between the casting and the outside reservoir. Unfortunately so far as practical application is concerned the body of metal in the gate and riser solidifies as it loses temperature to add another aggravating factor to a complicated situation. Where a riser freezes at the walls, at the top or in the neck before the casting solidifies, it cannot serve its intended purpose.

The following excerpts from the papers by Taylor and Rominski, coupled with the accompanying illustrations will appeal to foundrymen interested in a technique radically different from any now in use in the casting industry.

June 18, 1940, a patent *Means for Casting Metals*, U. S. Patent 2,205,327 was issued to John Williams and adopted at the plant of Dodge Steel Co., Philadelphia. The inventor developed a successful method for keeping blind risers open to the atmosphere. To the best of the writer's knowledge this patent is the earliest publication dealing with the influence of atmospheric pressure on solidifying castings. Others have claimed to have realized the theory involved in the process and to have sensed the possible advantages, but had not found the means of application in the simple form described in the patent, the insertion of a small dry sand core in the riser. This appears to be one of the major developments in the foundry industry, not alone because it makes blind risering practical, but because it adds materially to the fast growing knowledge of the laws governing solidifying castings.

The accompanying illustrations show some of the experimental work at the Naval Research Laboratory to prove the practical value of the new type riser in feeding steel castings and in general the function of atmospheric pressure in foundry practice.

Two Forces in Action

Movement of liquid metal from the riser and into the casting during the time of diminishing volume is the result of two forces which may act either together or in opposition. The most familiar is the force of gravity. The less obvious but even more important force of atmospheric pressure always is present, tending by one means or other to prevent the formation of any degree of vacuum in the solidifying casting.

An illustration of both forces acting in the same direction is seen where the riser is superimposed on the casting and designed to be the last to completely solidify, due to greater mass and hotter metal. A thin shell of solidified metal and liquid shrinkage progress simultaneously through contact of the outer metal with the sand. Liquid metal in the riser will be acted upon by gravitational and atmospheric forces moving the metal into the casting to prevent the formation of a void. In this instance both forces act in the same direction.

In another instance the riser may be at the same level as the top of the casting but placed at one side and designed to solidify last. Atmospheric pressure alone tends to move the liquid metals from the riser into the casting since gravitational force is balanced out. With atmospheric force acting equally on all parts of the casting, direction of effective action will be at that point which offers least resistance. If no solid shell forms on the surface of the riser, or if the shell is weak

enough to be ruptured at some point, the force will be at the upper surface of the liquid riser metal and will tend to force the metal downward, then upward into the casting.

In cases of opposing forces the direction of the greatest force, and hence the flow of feed metal can be determined by the following reasoning. The gravitational force will be directly proportional to the liquid head. Atmospheric pressure will be relatively constant at 14.7 pounds per square inch. An ideal case of this type of feeding may be compared to a simple mercury barometer in which atmospheric pressure forces mercury to a height of approximately 30 inches. Under similar conditions any other liquid is forced to a height which depends inversely on its density. For molten steel with a density somewhat less than 7.8, the height calculated from the mercury value, would be at least 52 inches given by the equation:

$$h = 30 \times \frac{13.6}{7.8} = 52$$

Theoretically it should be possible for a blind riser, properly kept open and under ideal solidification conditions throughout the casting-riser system, to force steel upward into a void to a height slightly more than 4 feet. However, this would be possible only if a maximum difference of pressure or in other words, a perfect void existed in the casting.

Several means can be used for keeping a blind head open, but none is known that will function with the same degree of success and simplicity as the new method developed at the plant of the Dodge Steel Co. The method consists in embedding a small cylindrical dry sand core in the sand at or near the top of the blind riser cavity so that it extends into it for a distance roughly equal to the radius of the riser. A vent hole is recommended in the core but it is not absolutely necessary. The core must be sufficiently strong and refractory to withstand pressure and temperature of the metal, also sufficiently permeable to allow passage of gas and air.

In action the core breaks the seal which otherwise would form completely over the riser, by extending into the liquid metal in the center. Acting through the permeable core, atmospheric pressure is able to force the metal from the riser into the complete or partial vacuum in the casting. Sand of the mold is sufficiently permeable to allow easy passage of the air to and from the core, so that full benefit at atmospheric pressure is realized. It has not been definitely determined whether the gas generated instantaneously by the core is necessary to initiate the contact with the atmosphere, but it is an added assurance.

Sand cores can be used to advantage in the ordinary open riser to prevent secondary shrinkage. By placing them at various levels with one end protruding into the center of the open riser they prevent the possibility of the riser cutting off atmospheric contact by freezing over.

Whether to use this or the more common method of feeding through open risers should be decided on the basis of casting design. At present no fixed rules can be laid down regarding when blind risers are to be preferred to open risers. With a few basic facts, a progressive attitude and an open mind, a foundryman can determine his practice from relatively short experience. In general it may be said that blind riser feeding has found its greatest application in light and medium weight castings.

An article now is being prepared which gives a more complete discussion of the developments which have been made in the application of blind risering to foundry problems. This article will be presented in an early issue of THE FOUNDRY.

THE EDITORS

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PRODUCING SILICON BRONZE

(*Concluded from page 65*)

or dry sand molds. Cores should be as collapsible as possible. The same core practice used in aluminum has proven ideal for silicon bronze.

The beginner will experience trouble with cracking, especially with the designs of varying cross section. This cracking will be reduced to a minimum as his technique improves through a study of proper gating, the placing of risers or chills to control directional shrinkage, the use of collapsible cores, and the easing in front of heads to aid in free contraction. Little trouble is experienced with differing cross sections if the lighter section is reasonably heavy. The greatest trouble is experienced when heavy lugs, bosses or ribs are attached to extremely light plate section.

Silicon bronze is excellent for hydrostatic pressure castings. It has a close, uniform grain structure and if properly shrunk, will have a deep pressure resisting surface that is less affected by machining inside and out than many other red bronzes.

Must Modify Patterns

If a casting is of such design that contraction is not retarded, silicon bronze will contract about 1/3 more per foot than phosphorus bronze or gun metal and patterns must be modified. In some cases this is a serious problem. For complicated designs requiring the use of several cores, it has been found, in many cases, that no change is necessary in patterns that were made for phosphorus bronze or gun metal.

Castings have a good surface and cleaning is relatively simple. The regular equipment in a brass cleaning shop is fully adaptable for silicon bronze.

Silicon bronze is readily weldable, the welded metal possessing approximately the same tensile strength as the original casting but is lower in ductibility.

To determine the wearing properties of silicon bronze, a test was conducted which consisted of driving a bushed steel shaft, approximately 3 inches diameter and 10 inches long, by a belt and pulley in the center. The equipment is shown in Fig. 5. On one end of shaft was mounted a cast phosphorus bronze bushing in a capped housing and on the opposite end a silicon bronze bushing was mounted. Light oil was used as a lubricant.

The shaft was run at 210 revolutions per minute continuously for 195 hours. Temperature readings were taken of the bearing hourly and accurate measurements made before and after the run.

The average temperature of the phosphorus bronze bearing was 89½ degrees Fahr., the average temperature of the silicon bronze was 85½ degrees Fahr. or 4 degrees Fahr. in favor of the silicon bronze. The average wearing on the phosphorus bronze bearing was 0.000286 inch, the silicon bronze was 0.000088 inch or 0.000198 inch less wear on the silicon bronze.

Silicon bronze is not a bearing bronze and does not replace tin-lead bearing metal, but it is equal in bearing properties to cast Navy phosphorus bronze for which it is being used as a substitute.

Silicon bronze being used in this war to conserve tin has given us far less problems than we encountered during the last war when the high shrinkage alloys were used as a substitute.

This article is from the paper presented by Mr. Crown before the 1942 convention of the American Foundrymen's Association in Cleveland.

THE EDITORS

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We are proud of being selected by leading engineering and equipment supply firms to furnish STEARNS Magnetic Pulleys and separators for foundry installations.

An indication of STEARNS prestige is the discerning number of manufacturers who prefer Stearns magnetic equipment year after year, in fact, our best customers are previous buyers.

Progress is born of experience and experience is your best protection. Stearns Magnetic set the pace in scientific magnetic pulley construction back in 1917 . . . Stearns Magnetic exclusively introduced the air-cooled magnetic pulley in 1922 . . . Stearns Magnetic has used the unit one-piece integrally cast magnet body since 1924.

The many new, exclusive and pioneer improvements built into Stearns magnetic products, their time proven construction, dependability and long life, economy of operation and low maintenance costs mean much to you.

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CONSIDERS EMERGENCY SPECIFICATIONS

(*Continued from page* 63)

magnesium has a lesser tendency to develop porosity than one containing 6 per cent aluminum, 3 per cent zinc, 0.2 per cent manganese, and remainder magnesium. Also the mechanical properties of the first mentioned alloy are more sensitive to porosity than those of the second alloy.

In the absence of C. D. Moriarty, General Electric Co., Schenectady, N. Y., a brief synopsis was made on his paper entitled, "Contrast and Latitude in Steel Casting Radiography." Contrast was explained as being the sharpness between the light and dark portions of the film. Latitude is the range or number of steps between the lightest gray to the dense black, or in other words, the greater the number of steps, the wider the latitude.

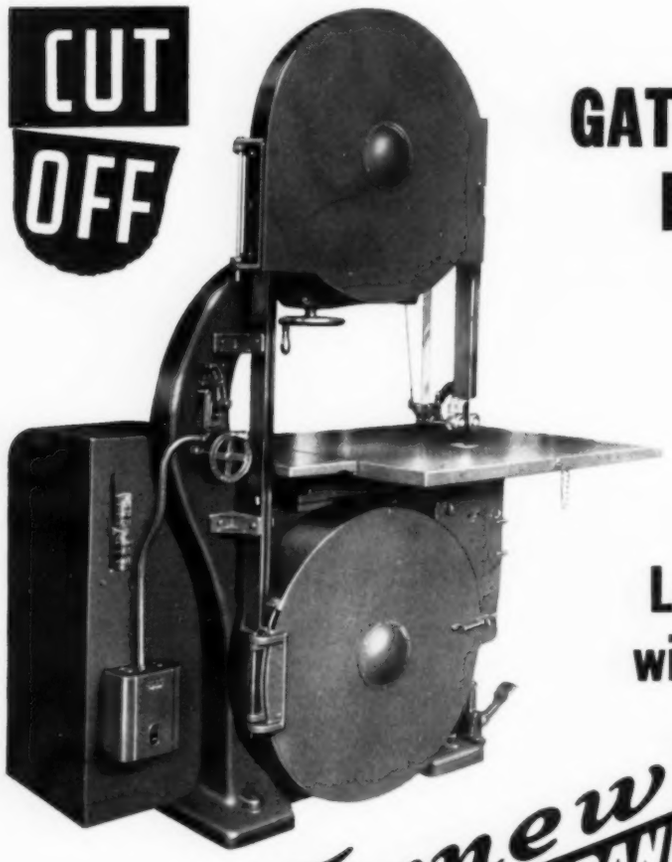
L. W. Ball, National Research Council, and D. R. Draper, Inspection Board of the United Kingdom and Canada, both of Ottawa, Canada, presented a paper describing "An Investigation of the Apparatus Used in Radium Radiography." The authors found that scatter from the ordinary type floors and walls in rooms where the examinations were conducted could be reduced about 10 times through the use of sheet lead linings. They also presented data on the relation of the quantity of radium employed, the distance from the object to be examined, and the exposure time, as a basis of obtaining optimum results. In another paper on "A Study of Cassette Design for the Radiography of Aircraft Castings," Mr. Ball pointed out that he had found lead sheets 0.0040-inch thick gave better results than sheets 0.0050-inch thick, and that the thinner sheets must be handled much more carefully.

Suggest Alternate Specifications

In the session on steel, ferroalloys and effect of temperature held on Wednesday afternoon, N. L. Mochel, chairman of Committee A-1 on steel, pointed out availability of six emergency alternate specifications for steel castings. Those include EA-A27 for carbon steel castings for miscellaneous industrial use; EA-A87 for carbon steel and alloy steel castings for railroads; EA-A148 for alloy steel castings for structural purposes; EA-A125 for carbon steel castings suitable for fusion welding for miscellaneous industrial uses; EA-A216 for carbon steel castings suitable for fusion welding for service at temperatures up to 850 degrees Fahr., and EA-A217 for alloy steel castings suitable for fusion welding for service at temperatures from 750 to 1100 degrees Fahr.

Emergency provisions in the steel castings specifications will bring certain of the requirements in line with other specifications, particularly federal specification QQ-S-681b and proposed Navy requirements, and should be a definite help in production. Mr. Mochel also stated that a new subcommittee had been formed to investigate cast converter steel, and to consider the re-establishment of that method of producing cast steel as one of the permissible procedures in various specifications.

At that session an interesting paper prepared by C. E. Sims and F. B. Dahle, both of Battelle Memorial Institute, Columbus, O., entitled, "Comparative Quality of Converter Cast Steel," was presented by Mr. Sims. Tests were run to determine the engineering properties of grade B converter cast steel in comparison with those made by the acid open hearth, basic open hearth, acid electric, basic electric, and cupola-converter-electric furnace processes. Except for lower phosphorus in the basic open hearth steel, composi-



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tions were similar in most respects.

Results obtained indicate that room temperature physical properties of the various steels followed well known effects of composition and inclusion type. Notched bar impact properties at low temperature were found to be dependent upon the deoxidation practice, without relation to melting unit employed. The same was found to be true with strain age-hardening effects. Standard fatigue and notched bar fatigue results were in accord with tensile properties rather than with notched bar impact properties. The author's conclusions were that the melting medium is of little moment in determining the properties of cast steel, and that the only way to insure any desired property is to specify that property and test for it.

Cites Impact Values

In the discussion following the paper, a written comment by H. W. Maack, Crane Co., Chicago, gave additional information on the notched-bar impact values of basic electric steel as 22 foot-pounds at 75 degrees Fahr.: 17.6 foot-pounds at 0 degrees; 12.2 foot-pounds at minus 20 degrees, and 9.8 foot-pounds at minus 50 degrees Fahr. A. H. Jamieson, Malleable Iron Fittings Co., Branford, Conn., stated that in his opinion the paper confirmed the view that there was no scintilla of evidence for placing converter cast steel in the doghouse. The Epstein results which formed that basis for rejecting the converter cast steel process were based on a material never used in the foundry—a high carbon-high phosphorus steel made in a bottom blow converter for wrought purposes.

John Howe Hall, Philadelphia, said that with the advent of desulphurization procedures sulphur no longer is a problem in converter steel since it can be reduced to any desired value, by proper choice of scrap, steel can be obtained with 0.03 per cent phosphorus. He pointed out that the converter cast steel process was rejected without any real evidence being submitted that it was inferior, except for high temperature applications for which it was not intended. He also said that in 1924 through 1926 considerable trouble was encountered in acid electric steel with aluminum embrittlement which was remedied with addition of more aluminum—a practice that was part of converter steel procedure. Mr. Hall moved that attention be called to the fact that present process clauses in A.S.T.M. specifications are highly undesirable. H. H. Morgan, chairman of the session stated that he was sure that the special committee appointed by committee A-1 on steel would give proper consideration to the paper by Sims and Dahle, and any other data submitted on converter cast steel.

In a session on nonferrous metals held on Thursday afternoon, Sam Tour, Lucius Pitkin Co., New York, and chairman of committee B-7 on light metals and alloys, cast and wrought, presented the report of that committee which recommended a revision in composition limits for alloy 0 in tentative specifications for aluminum-base alloy sand castings, B26-41T from 0.6 per cent maximum silicon to 0.4 per cent maximum to meet mechanical property requirements. J. J. Kanter, Crane Co., Chicago, presented the report of committee B-5 on copper and copper alloys, cast and wrought, in which attention was called to the availability of emergency alternate provisions in certain tentative and standard specifications for cast nonferrous alloys.

Those are EA-B30 for copper-base alloys in ingot form for sand castings; EA-B143 for tin-bronze and leaded tin-bronze sand castings; EA-B144 for high leaded tin-bronze sand castings; EA-B145 for leaded red brass and leaded semired brass sand castings; EA-B148 for aluminum bronze sand castings; EA-B0 for castings of the alloy copper 88 per cent, tin 8 per cent, zinc 4 per

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cent, and EA-B62 for composition brass or ounce metal castings. The provisions are designed to conserve tin and use of new copper, and permit use of scrap copper. The committee also made available emergency alternate provisions for leaded yellow brass sand castings for general purposes, EA-B146, in order to make possible the use of yellow brass scrap which is available in fairly large tonnage from ingot producers.

Thursday evening's session on iron was devoted to the presentation of reports from two committees and 4 papers on cast ferrous materials. J. J. Kanter presented the report of committee A-7 on malleable cast iron which stated that the proposed tentative standard for cupola malleable for flanges and pipe fittings was referred back to the committee, and that standard specifications A197-39 for cupola malleable iron and A47-33 for malleable iron castings be recommended to the American Standards Association for adoption as A.S.A. standards.

Following the report Mr. Kanter then presented a paper prepared by himself and Glen Guarnieri, Crane Co., Chicago, on "Some Creep Studies on Cupola Malleable Cast Iron," which indicated on the basis of high temperature studies that cupola malleable makes a creditable showing in relation to accepted values for silicon-killed carbon steel, having two-thirds creep strength at 800 degrees Fahr. The allowable working stress for malleable iron based upon creep studies, using an established policy of determining design stress, justifies 5600 pounds per square inch up to 775 degrees Fahr.—a value several times that used in current designs limited to 450 degrees. Excellent stability for malleable iron is indicated by long time fracture tests at high temperature, as well as room temperature tension tests on specimens with creep test history, and micrographical studies. Studies of permanent growth incident to creep testing show little effect until temperatures of 900 degrees Fahr. are reached, and then only a slight growth attributable in part to graphitization of residual pearlite.

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Reports on Cast Iron

J. S. Vanick, International Nickel Co., New York, presented the report of committee A-3 on cast iron which drew attention to emergency alternate provisions in specification EA-A190 for lightweight and thin-sectioned gray iron castings. The committee also recommended publication of a tentative method of compression testing of cast iron; revision of tentative standard A196-36T on definition of terms relating to cast iron; revision of standard specification A126-40 on gray iron castings for valves, flanges and pipe fittings; adoption as a standard specification, A74-39T tentative specifications for cast iron soil pipe and fittings, and withdrawal of standard specification A45-14 for cast iron locomotive cylinders, and of A46-30T on tentative specifications for chilled-tread cast iron wheels.

W. Leighton Collins, University of Illinois, Urbana, Ill., presented a paper describing a useful and reliable method of compression testing which has been used satisfactorily at the university, and which can be used in any testing laboratory. In discussing the paper J. S. Vanick pointed out the necessity of precision in squaring the ends of the specimens to be tested, and of spherical bearings to prevent end or edge cracking, particularly with white irons. Specimens with bell ends give a broader bearing and prevent end cracking in such cases. However with proper care, the use of the square end specimen was simpler. Prof. M. F. Sayre, Union College, Schenectady, N. Y., said he believed that the need for spherical bearings was not so necessary due to improvement in machining methods, and called attention to the possibility of binding of the plunger in the sleeve of the testing device if

the head of the machine does not provide parallel pressure conditions. Mr. Collins replied that no difficulty was encountered with misalignment.

Richard Schneidewind, University of Michigan, Ann Arbor, Mich., and Edward C. Hoenicke, Eaton-Erb Foundry division, Eaton Mfg. Co., Detroit, prepared a paper on "A Study of the Chemical, Physical and Mechanical Properties of Permanent Mold Gray Iron" which was presented by Mr. Schneidewind. The irons examined contained about 2.55 per cent silicon, 1.01 per cent manganese, 0.086 per cent sulphur, 0.215 per cent phosphorus, and 3.52 per cent total carbon, and cast in water-cooled metal molds. Specimen bars upon which tests were conducted were of such size that after machining the diameters were 2, 1.2, 0.875 and 0.5-inches.

Previous to testing the bars were annealed fully to produce a structure of alpha ferrite and graphite. It was found that tensile strengths of the bars varied inversely as section size. The 0.5-inch bar had a tensile of 52,267 pounds per square inch while the 2-inch bar had a strength of 22,533 pounds per square inch. Brinell hardness number of the bars varied from 153 to 168 while compressive strength ranged from 99,783 pounds per square inch for the 2-inch bar to 124,342 pounds per square inch for the 0.5-inch bar.

Final paper at the session on iron was prepared by W. Leighton Collins and James O. Smith, both of the University of Illinois, Urbana, Ill., and was presented by Mr. Collins. It dealt with the "Notch Sensitivity of Alloyed Cast Irons Subjected to Repeated and Static Loads," and the investigation included four cast irons of class 20, 30, 40 and 50 ranging in chemical composition from an ordinary gray iron to highly alloyed irons.

Data obtained indicated that for repeated bending, torsional and axial loading, ordinary gray iron is relatively insensitive to effects of notch, but as static tensile strength of the irons increase, the notch sensitivity to repeated loading increases. However, that tendency is less pronounced for the class 40 (inoculated) iron tested than for the others. Also contrary to the general impression the four irons investigated were found to be insensitive to the effects of notch under static tensile, compressive and torsional loads, respectively.

John F. Diehl has opened a warehouse at 210 E. 34th street, New York, and will carry a stock of all types and sizes of toggle clamps produced by the Detroit Stamping Co., Detroit.

Form Steel Casting Advisory Group

A steel casting advisory committee to serve as a liaison unit between the OPA and manufacturers of steel castings has been organized. Members of the committee are: N. K. Anderson, Alloy Steel & Metals Co., Los Angeles; E. E. Burke, Otis Elevator Steel Castings Division, Otis Elevator Co., Buffalo; Herbert Farrell Jr., Farrell-Cheek Steel Co., Sandusky, O.; M. A. Fladoes, Sivyer Steel Castings Co., Milwaukee; C. L. Harrell, Sterling Steel Casting Co., East St. Louis, Ill.; T. H. Harvey, Ohio Steel Foundry Co., Lima, O.; C. W. Howat, Continental Roll & Steel Foundry Co., Pittsburgh; Oliver E. Mount, American Steel Foundries, Chicago; F. M. Robbins, Ross-Meehan Foundries, Chattanooga, Tenn.; J. A. Sauer, Symington-Gould Corp., New York; Thomas H. Shartle, Texas Electric Steel Casting Co., Houston, Tex.; Clarence Tolan Jr., Dodge Steel Co., Philadelphia; L. C. Wilson, Reading Steel Casting Division, American Chain & Cable Co. Inc., Reading, Pa.

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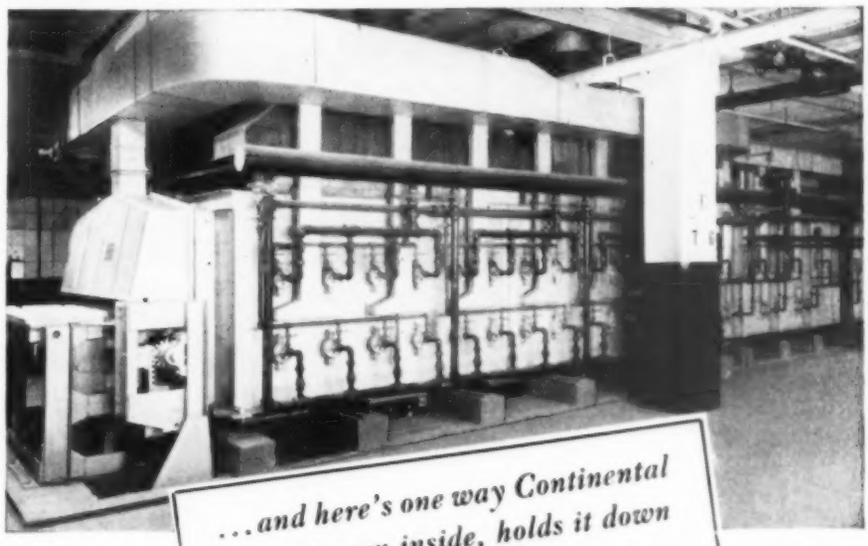

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LIGHT ALLOY CASTINGS IN AIRCRAFT

(*Continued from page* 71)

harden, then are removed from the flask and baked to completely calcine and dry, leaving them very porous to allow gases to escape. Cores are made in the same fashion as the molds. Castings produced by this process have surfaces almost as smooth as metal mold castings.

Sand casting alloys may be cast in the smaller castings with ⅛-inch minimum wall thickness. The usual allowance for machining is 1/16-inch. Permanent mold castings, depending on size and design, can be cast with 3/32-inch minimum wall thickness. Overall dimensions usually can be held to ±0.010-inch. Usually, 1/32-inch is allowed for machining. Sections in die castings can be produced as thin as 0.020-inch, although 1/16-inch is preferred. A section tolerance of ±0.0025-inch can be held. Plaster mold castings can be held to tolerances of ±0.005-inch and better.

By the addition of various alloying elements or "hardeners" to aluminum and magnesium, both tensile strength and casting properties are improved. By alloying alone, strengths almost double that of commercially pure aluminum and magnesium are obtained. Elements commonly used as hardeners for aluminum are copper, silicon, magnesium, zinc, manganese, nickel and iron. Elements commonly used as hardeners for magnesium are aluminum, manganese and zinc.

Silicon-Aluminum. Silicon-aluminum alloys are very fluid, have excellent casting characteristics, and thus are used for thin-walled and complicated castings. Castings are very dense and leak-proof. They have a lower specific gravity than other aluminum alloys and good corrosion resistance. They are alloys of low tensile strength and low yield strength. High silicon-aluminum alloys are difficult to machine.

Copper - Aluminum. Copper - aluminum alloys respond to heat treatment and, therefore, have high strength and hardness. These alloys are not used for very thin sections and the castings are not as pressure-tight as castings of the silicon-aluminum alloys. They possess a desirable combination of good casting characteristics and good machinability.

Copper-Silicon-Aluminum. Copper and silicon, when added together to aluminum, make the alloys particularly suitable for permanent mold and sand casting applications because of their excellent casting characteristics. They can be used for large and intricate sand castings. These ternary alloys have a wide application, since they respond well to heat treatment, producing excellent mechanical properties. They are leak-proof, pressure tight and retain their strength up to 400 degrees Fahr. This group of alloys attempts to combine the casting characteristics of the silicon-aluminum alloys with the mechanical properties and machining characteristics of the copper-aluminum alloys.

Magnesium - Aluminum. Magnesium-aluminum alloys are difficult to cast, but they have maximum resistance to corrosion. These alloys have lower specific gravity and excellent mechanical properties. They are not recommended for intricate or leak-proof castings.

Magnesium - Copper - Aluminum. These alloys are excellent heat treatable alloys. Magnesium added to the binary copper-aluminum alloys increases the response of these alloys to heat treatment.

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maintaining the high properties at elevated temperatures and in providing an alloy not subject to permanent growth on heating. These alloys retain strength up to 600 degrees Fahr. They respond well to heat treatment and become very hard after complete aging following the solution treatment. Care must be exercised in casting these alloys.

Tables I, II and III show the typical compositions, typical physical properties and commercial equivalents of aluminum alloys.

Aluminum added to magnesium refines the grain, increases yield strength, increases hardness and decreases ductility. Zinc added to magnesium increases corrosion resistance and strength after heat treatment. Manganese added to magnesium increases its resistance to salt water corrosion.

Magnesium casting alloys may be classified according to their characteristic uses, as shown in Table IV.

Table V shows typical physical properties of the alloys given in Table IV. Designation for the heat treatment are explained in the footnote in Table V.

Cast in Sand Molds

Sand casting of aluminum and magnesium alloys is the method most frequently resorted to in obtaining castings for aircraft construction. Wood patterns are frequently used, but metal patterns are desired where there is quantity production. There is practically no limit to the size or core complexity of castings made by this method. Such foundry considerations as section thickness, gating, risering, chilling, pouring temperature, permeability and moisture content of the sand, and any other factors which influence the rate of metal solidification, have a material effect on the mechanical properties of the castings.

Cast aluminum and magnesium alloys have low strength at temperatures just after solidifying and, if free contraction of the metal is not permitted, cracks may be produced in the castings. Therefore, the sand molds must be relatively soft, and cores must soften at low temperatures to obtain sound castings. The low specific gravity of the aluminum and magnesium alloys makes extra venting necessary so that all gases can be removed rapidly from the molds.

In sand castings, 3/16-inch per foot is allowed for unrestrained shrinkage and 5/32-inch per foot is allowed for restrained shrinkage by bosses or cores. In die castings, the maximum permissible wall thickness is 0.375-inch while the minimum permissible wall thickness is specified as 0.060-inch.

Magnesium cast alloys in heat-treated form exhibit excellent tensile properties and fatigue resistance but are sensitive to conditions producing local stress concentrations. They are satisfactory for applications demanding high fatigue strength if care is taken to avoid sharp corners and abrupt changes in section. Portions of a casting that are highly stressed should be provided with liberal fillets blended into the body of the casting. Edges of cored holes and webs should be beaded. Stud bosses should be of ample size with good radiuses provided at their bases. When magnesium alloy castings replace aluminum, increases in wall sections seldom are required. When they replace cast iron or steel, a redesign of the important sections is necessary.

Aluminum Alloys for Sand Castings. Alloy 43 (Tables I, II, III) has low tensile and low yield strength. Owing to its high fluidity, it is used for complicated and thin walled castings. It is dense, leakproof, and has good corrosion resistance. It is used for carburetors, hot air scoops, fuel line fittings, fuel and oil tank flanges, oil pans,

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gear case covers and accessory housings. This same alloy is used for castings of the types indicated when cast by the permanent mold and die casting processes.

Alloy 47 (Table I) is an alloy of higher silicon content than alloy 43 with subsequent higher strength when modified. It is the lightest and most fluid of all the aluminum alloys, but is more difficult to machine and tap. Its uses are the same as for alloy 43, but for thinner walled and more complicated castings, and also for castings requiring higher mechanical properties.

Alloy 122 (Table I) is a heat-treatable alloy used for parts subject to high temperature and requiring high hardness and strength. It is used for pistons, carburetors, intake manifolds, bearing surfaces and air-cooled cylinder heads.

Alloy 142 (Table I) is a heat-treatable alloy known also as "Y" alloy. It maintains its strength well at elevated temperatures up to 600 degrees Fahr. It is used for cylinders, air-cooled cylinder heads, pistons and bearing surfaces.

Alloy Machines Readily

Alloy 195 (Table I) is one of the most commonly used heat-treatable alloys, having good strength and high shock resistance. It is not as corrosion resistant as the aluminum-silicon alloys, but machines better and has greater strength. It is used for most structural castings, gear cases, crankcases, gear housings, oil pans, controls, rudder pedals, sockets, horns, some cylinder heads, propeller gear boxes, superchargers, transmission gear cases and covers for dirigibles, and also starter and generator housings.

Alloy 214 (Table I) does not respond to heat treatment. It is more difficult to cast than the aluminum-copper and aluminum-silicon alloys and is not recommended for intricate or leak-proof castings. It has excellent corrosion resistance, high ductility, and strength intermediate between alloy 43 and the heat-treated alloys. It is used for housings and parts of simple design requiring high corrosion resistance.

Alloy 220 (Table I) is a heat-treatable alloy of excellent resistance to corrosion, especially to high octane aviation gasoline. It is not recommended for leak-proof castings, castings of thin-walled sections, or for castings for use at elevated temperatures. The alloy is more difficult to cast than the other aluminum-base alloys, requiring special sand and handling practice.

Alloy 355 (Table I) is one of the best aluminum casting alloys, as it has excellent casting qualities and retains its strength well at elevated temperatures up to 400 degrees

Fahr. It is leak-proof and pressure tight. It also responds well to heat treatment. It is used for liquid-cooled cylinder heads, cylinder blocks in liquid-cooled engines, propeller gear boxes, gear housings, superchargers, crankcases, accessory housings, etc. It is also used for cylinder heads in air-cooled engines of intermediate horsepower.

Alloy 356 (Table I) is used as a substitute for alloy 195 when the casting is very complicated. Aging alone will improve the properties, but quenching and aging will produce the maximum properties. It is used for cylinder heads and cylinder blocks in liquid-cooled engines. It is also used for many of the applications referred to under alloy 195.

Aluminum Alloys for Permanent Mold Castings. Alloy 43 has the same characteristics and applications, where cast in permanent molds, as when cast in sand molds.

Alloy A108 (Table II) combines the desirable characteristics of both the silicon-aluminum and the copper-aluminum alloys.

Alloy 122 (Table II) is used for brake shoes, bearing caps, pistons, camshaft bearings, where high hardness and good bearing properties are required.

Alloy A132 (Table II) has lowest coefficient of expansion and lowest weight of the permanent mold aluminum alloys. It possesses excellent bearing and wearing qualities and is used for brake shoes, bearing caps and engine pistons.

Alloy 142 (Table II) is used for pistons, brake shoes, air-cooled cylinder heads.

Alloy B-195 (Table II) is used for pistons, bearing caps, and wherever alloy 195 sand castings are used.

Alloy 355 (Table II) is one of the best alloys, as it has excellent casting qualities and retains its strength well at elevated temperatures up to 400 degrees Fahr. It is leak-proof and pressure tight. It also responds well to heat treatment. It is used for propeller gear boxes, gear housings, superchargers, crankcases, accessory housings, etc.

Aluminum Alloys for Die Castings. Alloy 13 (Table III) has good casting qualities, highest fluidity and freedom from hot shortness. It has relatively high strength and good corrosion resistance. It is used for housings, instrument and accessory parts, bomb-rack anchors, air intake check valves, and large intricate castings.

Information given in preceding paragraphs dealing with the use of alloy 43 in sand castings also is applicable to die castings made from that alloy.

Alloy 85 (Table III) has good casting qualities and gives a good combination of strength and ductility. It is used for housings, instruments and accessory parts, cockpit inclosure parts, deicing manifolds, brackets and parts of heavy section.

Alloy 218 (Table III) has excellent resistance to corrosion and excellent strength and ductility. It does not cast as well in intricate castings as alloy 13. It is used for fittings and castings requiring high strength and resistance to corrosion, airplane wheel flanges, and brake shoes.

Magnesium Alloys. The magnesium alloys, shown in Tables IV and V, have the following applications in aircraft construction:

Permanent Mold Castings: Landing wheels, crankcases, starter and generator housings.

Die Castings: Engine rocker box covers, shroud tube fittings, accessory housings.

Sand Castings: Engine crankcases, gear cases and covers, engine nose sections, tail wheel assembly parts, brake assemblies, starter housings, pump housings, intake manifolds, oil sumps, supercharger rollers, hydraulic pump bodies, thrust bearing housings, diffuser plates, camshaft housings, generator housings, window frames,

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To expedite aircraft production and facilitate manufacture of light metal castings, a concentrated effort is being made to reduce to a minimum the number of alloys used. This has a marked beneficial effect on all concerned in the refining, casting, heat treating and fabricating of light metals. Fewer alloys means less chance for contamination in the foundry and offer more castings of the same alloy that can be heat treated at the same time.

Since a high, strength-weight ratio is a prime factor in aircraft design, the mechanical properties of the alloys are given first consideration; machinability and corrosion resistance being secondary in most cases.

Popular aluminum alloys are the equivalents of alloys 142, 195 and 355 for sand castings; alloys 142, B195 and 355 for permanent mold castings; and alloy 13 for die castings. The popular magnesium alloys are the equivalents of alloys H and C for sand castings, alloy H for permanent mold castings and alloy R for die castings.

Respond To Heat Treatment

Certain aluminum castings, through the addition of alloying elements, will respond to heat treatment which imparts mechanical properties superior to the alloys in the "as-cast" condition. Various heat treatments may be used, depending upon the size of castings and the physical properties desired.

As a general rule, heat treatment consists of two processes; namely, the solution treatment, which is carried out in the range of 900-1000 degrees Fahr., and an accelerated age or precipitation heat treatment at from 300-600 degrees Fahr. The solution treatment is usually done in electric furnaces, since it has been found that slight traces of sulphur in the furnace atmosphere will affect materially the castings, because of intergranular embrittlement which results. Circulatory fans are placed in the furnaces to provide a uniform distribution of the heated air. The solution treatment, which takes from 6 to 14 hours, usually is followed by rapid quench in boiling water. Because of the strain induced upon the castings as a result of the quench, intricately designed castings are likely to crack. In such cases, the quench must be eliminated, with the resultant lowering of mechanical properties.

Castings, after solution treatment, will, in a period of 3 to 4 months, undergo an aging reaction,

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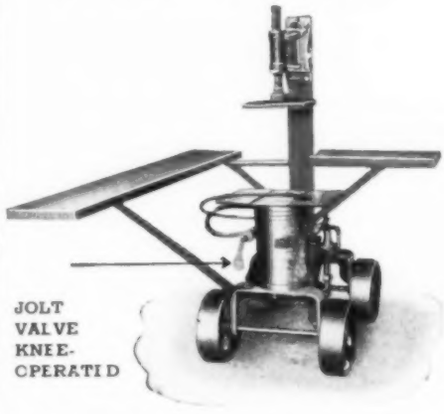

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resulting in an increase in tensile strength, yield strength and hardness, with a decrease in ductility. This precipitation hardening proceeds rapidly at first, and, for all practical purposes, has progressed sufficiently after 3 or 4 days to give expected solution treated properties.

Complete aging may be accelerated by a precipitation heat treatment. This may be done in either an electric or gas-fired oven and consists of an intermediate age or overage. The latter treatment is given castings where complete stability and maximum tensile strength are desired.

In cases where stability of the material is desired and where maximum physical properties are not necessary, a simple precipitation treatment may be employed, which consists of about a 450 degree Fahr. age for a period of 6 to 8 hours.

Certain magnesium alloys also respond to similar heat treatments. For solution treatment, the castings are heated in a circulating-type furnace to a temperature of 730-760 degrees Fahr. for a period of about 20 hours. Unlike aluminum, however, it is not necessary to quench the castings after solution treatment. Properties are obtained by a quick air cool. Aging or precipitation heat treatment takes place at 350 degrees Fahr. for 16 to 20 hours.

Castings May Be Scorched

At the solution treatment temperature, especially in the case of alloy C, which requires the highest temperature, there is a danger of scorching the castings. Therefore, it is advisable to introduce atmospheric control; usually an atmosphere of sulphur dioxide. Since traces of sulphur are detrimental to the heat treatment of aluminum castings, they should never be heat treated in a furnace containing sulphur fumes from a previous magnesium heat.

Several chemical treatments have been developed for improving the appearance and corrosion resistance of aluminum castings. The most widely used for aircraft parts is an electrochemical method for forming an aluminum oxide film, known as anodizing or Alumiliting. Castings to be treated by this process are first thoroughly cleaned and then suspended from the anode into an electrolyte composed of 5-10 per cent chromic acid or 15-18 per cent sulphuric acid. The latter electrolyte is the Alumilite process a patented method, and, because of the porous condition of the oxide film, provides a method of dying the casting to produce any desired surface color. These processes will make aluminum resistant to better than 700 hours' exposure in a 20 per cent salt spray solution. Di-

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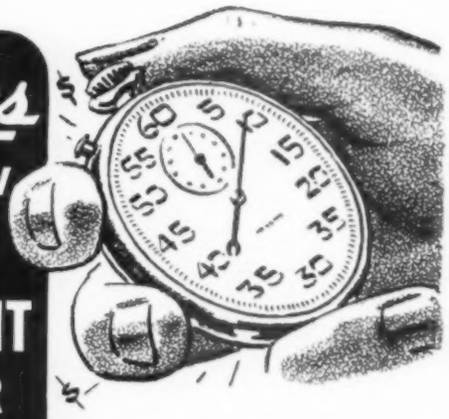

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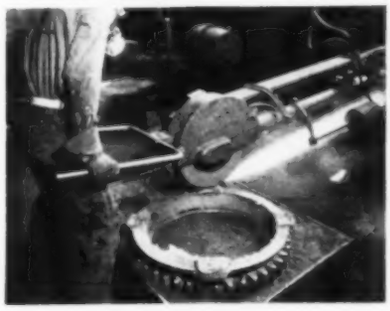

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mensional changes from these treatments are about 0.0001 or 0.0002-in. and therefore do not effect materially threaded or other close tolerance surfaces.

A chemical treatment, known as the Alrok treatment, which also is patented, has been developed where a less resistant coating can be used and where a less expensive process is desired. Electrical generating equipment is not necessary and production costs are lower. This process is used extensively as a paint base, since the surface coatings are not as thick or abrasive resistant as the electrochemical coatings.

An anodic treatment for magnesium castings has been developed and is known as the PT13 treatment, which is the Navy Aeronautical Specification for the process. The castings, after cleaning, are anodized in an electrolyte of dilute sodium dichromate and monosodium phosphate by passing an electric current through for about 30 minutes. The most commonly used magnesium alloys should withstand approximately 200 hours' salt spray when given this treatment.

Favor Chemical Treatment

Chemical treatments of magnesium, which have been developed by two suppliers of magnesium metal, are more widely used than the electrochemical anodic treatment.

Rough castings and wrought stock generally are given a chrome pickle treatment, which consists of a short-time dip in a solution of sodium dichromate and nitric acid. The treatment passivates and slightly etches the surfaces of the metal, which gives, as a result, a surface well adapted for painting. Because of the etching effect of the solution, about 0.001-inch of metal will be removed, making this process impractical on finish machined parts. It does, however, have the advantage of very low dielectric properties, which are necessary in one-wire electrical systems.

Finish machined castings usually are given an alkaline dichromate treatment, consisting of a dip in dilute hydrofluoric acid, followed by boiling in sodium dichromate. An improved modification of this process involves boiling the castings after the hydrofloric acid dip in a solution of ammonium sulfate, sodium dichromate and ammonia, and sealing this coating in a dilute solution of boiling arsenous oxide. When the dichromate treatments are used, a high dielectric film is formed which must be removed if electrical conductivity between assembled parts is desired.

There are often applications of magnesium or aluminum castings where pressure tightness is neces-

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sary, and frequently castings, which are otherwise satisfactory, are subject to rejection because of seepage when pressure tested.

Several methods have been developed for impregnating porous castings, wherever this method of salvage is acceptable. Solutions of sodium silicate, lacquer, or bakelite, generally are used for aluminum castings, and chinawood oil or lacquer for magnesium castings.

The process consists of a prebake to drive the moisture from the castings, after which they are placed in a pressure chamber which is evacuated. The impregnated solution then is allowed to flow into the chamber, covering the castings, after which pressure is applied to force the solution into the evacuated pores. The castings then are removed from the pressure chamber and baked to harden or polymerize the solution as the case may be. After baking, the castings are sand blasted and pressure tested. Castings showing visible blow holes or other large defects are never given this treatment.

References

1. Welty, G. D., S.A.E. *Journal*, November 1929.
2. Dix, E. H., S.A.E. *Journal*, November 1929.
3. Gann, J. A., *Industrial and Engineering Chemistry*, July 1930.
4. Allen, A. H., THE FOUNDRY, August 1939.
5. Grant, L., *Metal Industry*, December 1939.
6. Woldman, N. E., *Metals and Alloys*, October 1940.
7. Woldman, N. E., *Iron Age*, February 27, 1941.
8. Woldman, N. E., *Iron Age*, March 6, 1941.
9. Ward, R. E., THE FOUNDRY, May 1941.
10. Aluminum Co. of America, Publications and catalogues.
11. Dow Chemical Co., Publications and catalogues.

Boiler and Radiator Group Formed

An advisory committee for the cast iron boiler and radiator industry recently has been formed to assist the War Production Board. Members of the committee include: R. E. Daly, American Radiator & Standard Sanitary Corp., Pittsburgh; V. A. Good, Burnham Boiler Corp., Irvington, N. Y.; L. N. Hunter, National Radiator Co., Johnstown, Pa.; John P. Magos, Crane Co., Chicago; J. F. McIntire, United States Radiator Corp., Detroit; H. F. Randolph, International Heater Co., Utica, N. Y.; Stanley K. Smith, The H. B. Smith Co. Inc., Westfield, Mass.; Lester O. Stearns, Columbia Radiator Co., McKeesport, Pa.; W. R. Stockwell, Weil-McLain Co., Michigan City, Ind. W. W. Timmis, chief, plumbing and heating branch, is government presiding officer.

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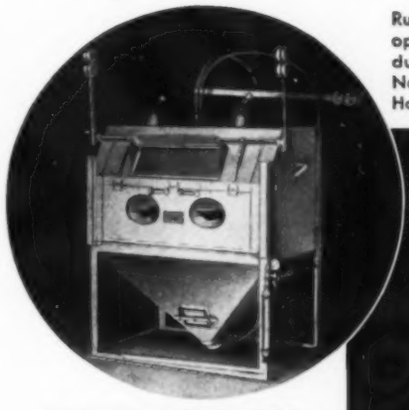

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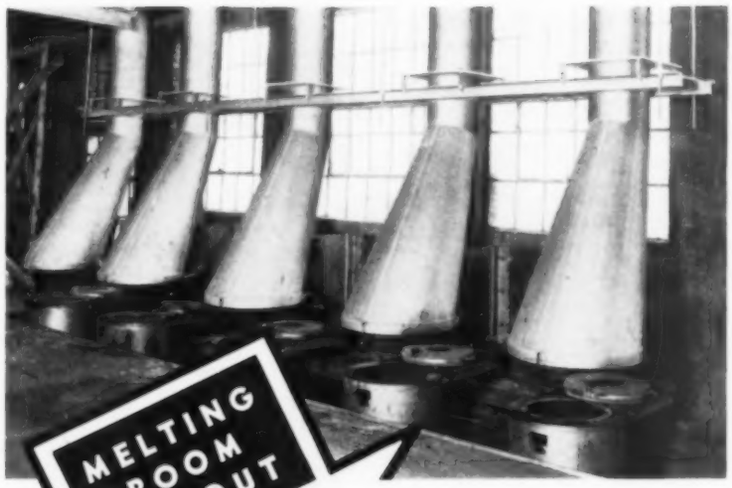

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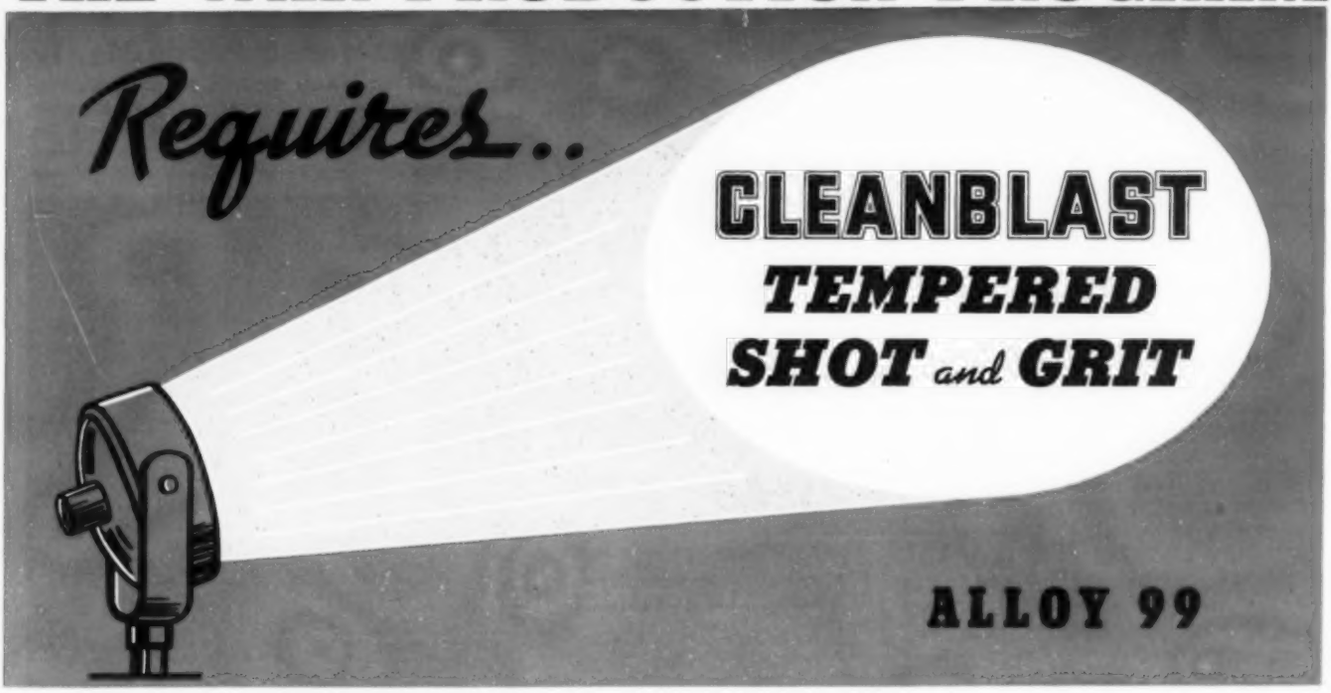

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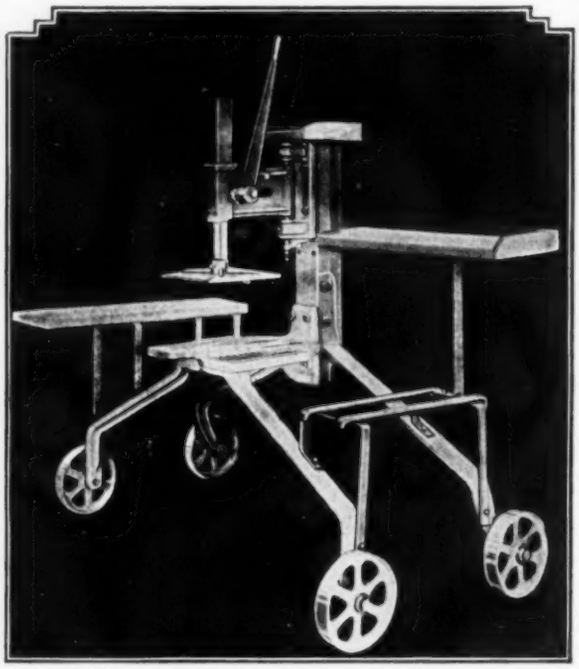

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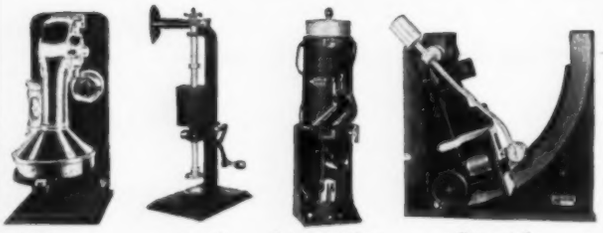

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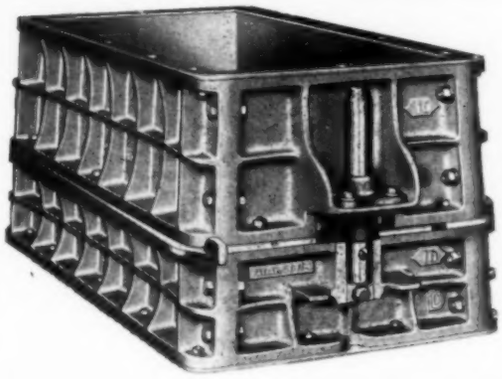

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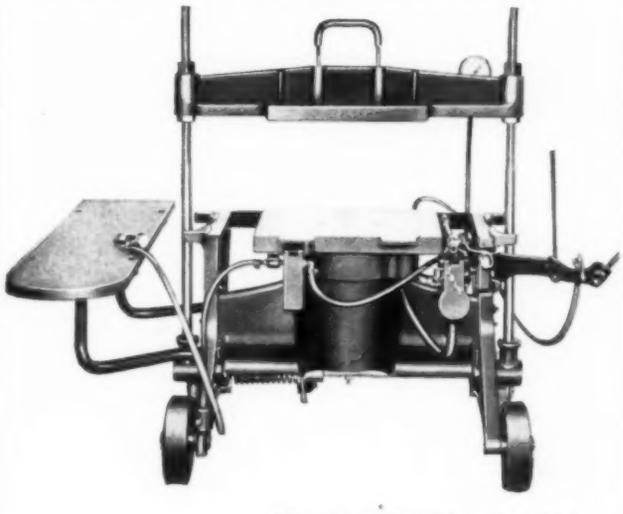

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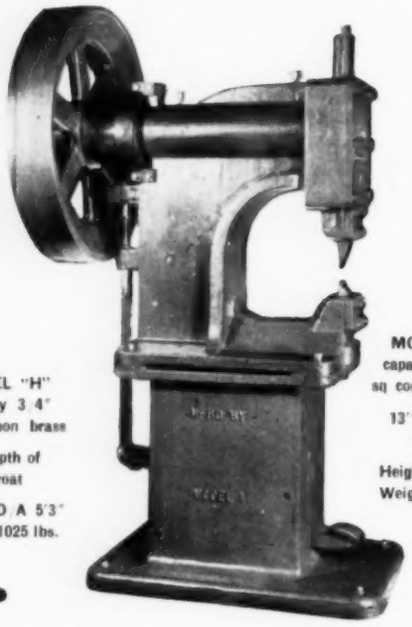

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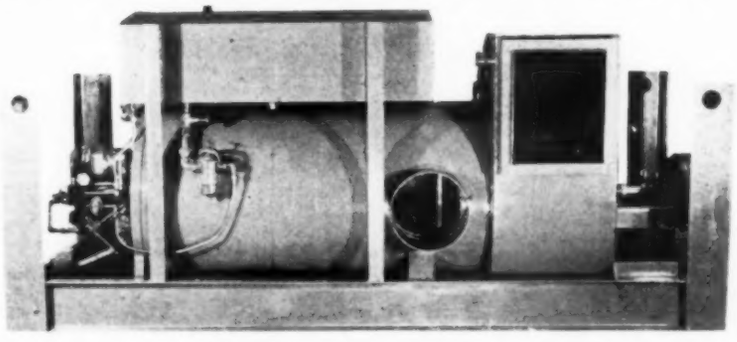

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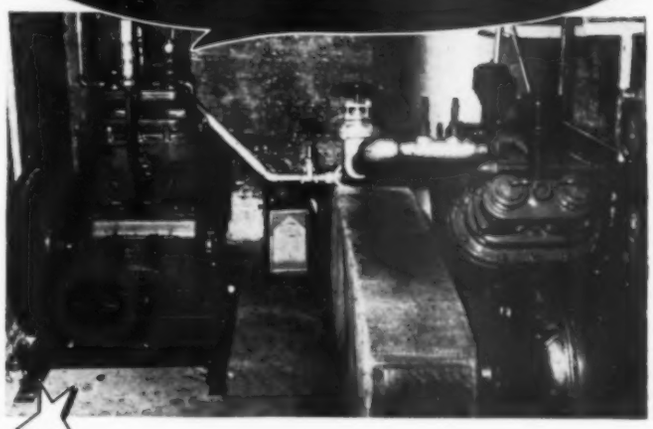

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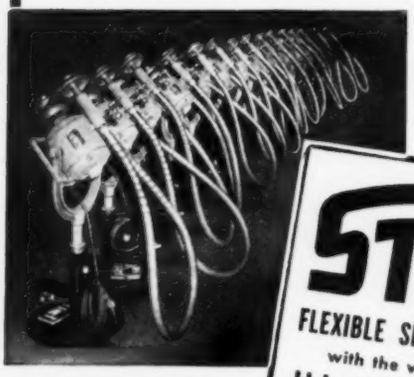

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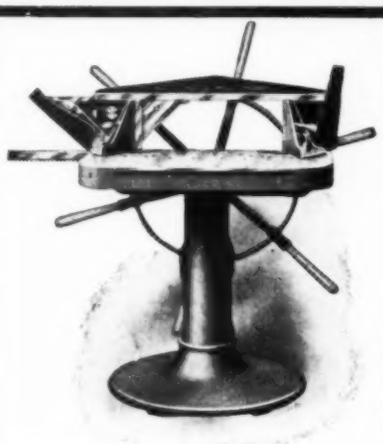

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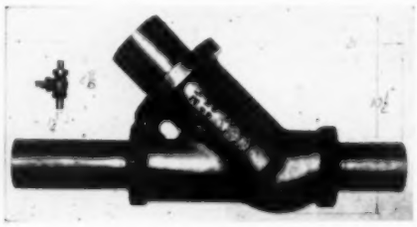

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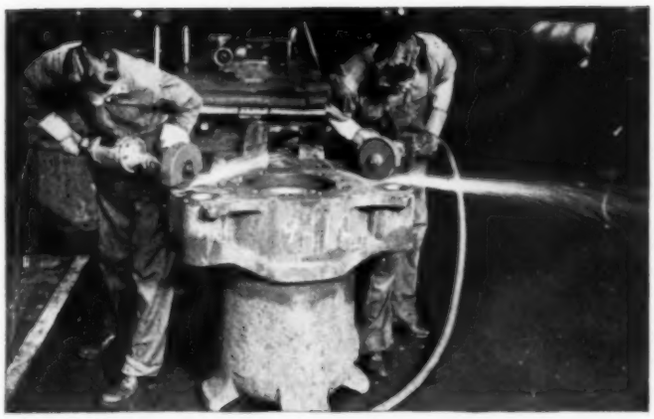

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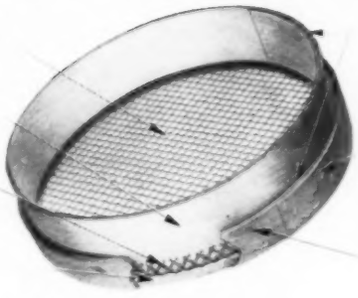

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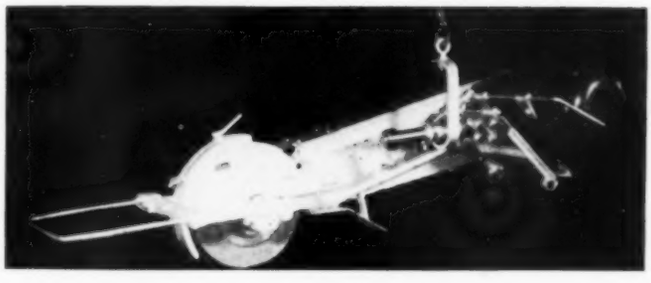

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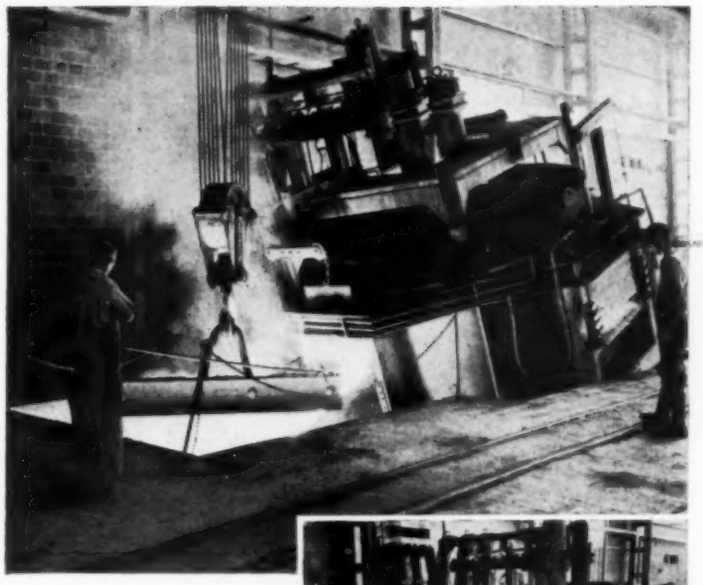

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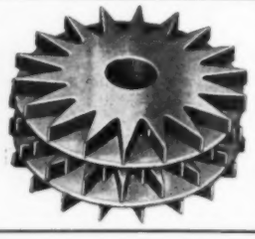

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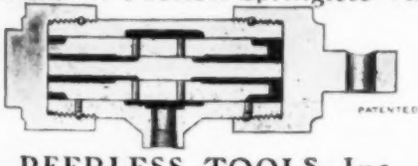

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National Cylinder Gas Co., 205 W. Wacker Drive, Chicago, Ill.

WHEELBARROWS
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee, Wis.

WHEELS (Cut-off)
West Co. Inc., 1117 Shackamaxon St., Philadelphia, Pa.

WHEELS (Wire)
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, O.

WIRE BRUSHES
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, O.

WIRE CLOTH
Buffalo Wire Works Co., 425 Terrace, Buffalo, N. Y.

WIRE NAILS
Bethlehem Steel Co., Bethlehem, Pa.

WIRE ROPE
American Cable Division of American Chain & Cable Co., Inc., Wilkesbarre, Pa.
Hazard Wire Rope Division of American Chain & Cable Co., Inc., Wilkesbarre, Pa.

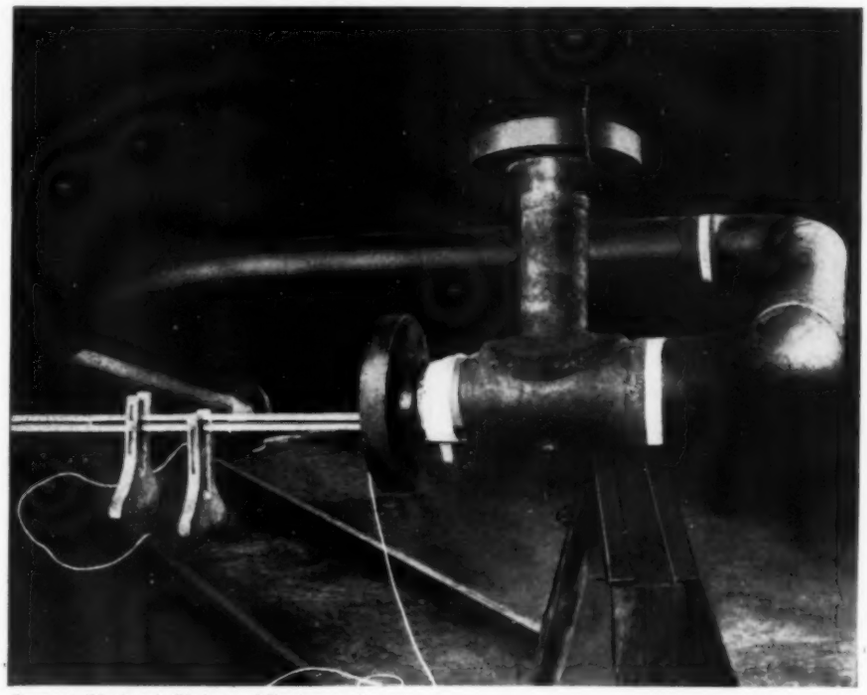
WOODWORKING MACHINERY
Delta Mfg. Co., Industrial division, 620 E. Vienna Ave., Milwaukee, Wis.
Oliver Machinery Co., Grand Rapids, Mich.

X-RAY EQUIPMENT
General Electric X-Ray Corp., 2012 Jackson Blvd., Chicago, Ill.

X-RAY FILMS
Picker X-Ray Corp., 300 Fourth Ave., New York City.

—When writing advertisers, please mention THE FOUNDRY—

RADIUM *for* INDUSTRIAL RADIOGRAPHY



Courtesy Pittsburgh Piping and Equipment Co.

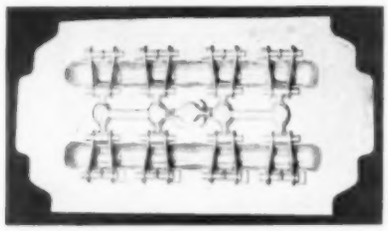
The illustration shows radium being used to take a radium-radiograph of a weld. Placing the radium centrally in the pipe and the film on the outside permits of taking a radiograph of the entire circumferential weld with one exposure. This is just one of the many advantages of the use of radium for industrial radiography.

RADIUM MAY BE PURCHASED OR RENTED BY THE DAY, MONTH OR YEAR.

WRITE FOR DETAILS

Pioneers in the Use of Radium for Industrial Radiography

RADIUM CHEMICAL COMPANY, INC. · 570 Lexington Ave., N. Y. · Chicago: Marshall Field Annex Bldg.



Quality Precision Pressure-Cast Plates
Cope and Drag Plates · Multiple Core Boxes
MANY YEARS EXPERIENCE IN THIS FIELD
Ask for List of Satisfied Customers—Write for Details

PLASTER PROCESS CASTINGS CO.
6922 Carnegie Ave.—Cleveland, O.

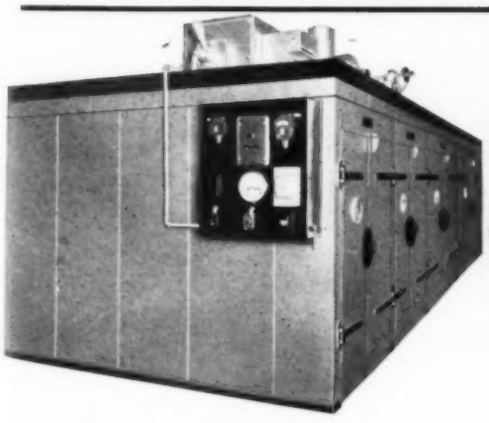
For Better Blown Cores, Use

DEMMLER CORE BOX VENTS

PERFORATED VENTS
No. 00, No. 0, No. 1 or No. 2 holes

SLOTTED VENTS
Brass or Steel
Slots .010" to .015"

WM. DEMMLER & BROS.
Kewanee - Illinois



GKS OVENS . . .

Electric . . . Gas . . . Oil . . . Standardized sizes from unit parts, or custom-built to meet the specific requirements of your production . . .

For detailed information write, wire or phone.

GEORGE KOCH SONS · · EVANSVILLE, INDIANA

Classified Advertising

Help Wanted

SUPERINTENDENT WANTED

For malleable job order foundry. One who is thoroughly familiar with gating, sand control, molding and coremaking, and is capable of handling men. In reply, please state age, experience in detail as to number of men in charge of, capacity and duties of present and previous positions, as well as salary desired. Address Box 777, The FOUNDRY, Cleveland.

FOUNDRY FOREMAN WANTED!

One experienced on marine engine work. Must be aggressive and have sufficient experience to take charge of large gray iron foundry. In replying, give full details covering experience, age, copies of references from previous employers, and amount of salary expected. Address Box 698, The FOUNDRY, Cleveland.

ATTENTION SALESMEN!

Representatives now calling on foundries regularly are wanted by a well-known manufacturer of high grade line of plumbago, facings, parting, blacking, core wash and allied foundry items. Liberal commission basis. Please advise territory covered, lines now handled, experience with foundry items, etc. Address Box 217, The FOUNDRY, Cleveland.

WANTED—CHIEF METALLURGIST

Responsible position with assurance of permanence. Middle West steel foundry. Must have had experience in steel casting field. Both control and research. References required. Excellent opportunity. Address Box 764, The FOUNDRY, Cleveland.

WANTED

IN JOBBING FOUNDRY LOCATED IN EASTERN PENNSYLVANIA, PRODUCING STEEL CASTINGS, ACID ELECTRIC PROCESS, RANGING FROM 1 LB. TO 3 TONS, A MAN WHO IS THOROUGHLY FAMILIAR WITH HEADING AND GATING AND HAS A GOOD KNOWLEDGE OF MOLDING AND COREMAKING AND IS CAPABLE OF HANDLING MEN; ACTING IN THE CAPACITY OF ASSISTANT TO FOUNDRY SUPERINTENDENT. IN REPLY, PLEASE STATE AGE, EXPERIENCE AND SALARY DESIRED. ADDRESS Box 619, The FOUNDRY, CLEVELAND.

SALESMAN WANTED

Highly rated manufacturer wants man to cover Illinois and Indiana thoroughly familiar with all core room materials—particularly core oils. Salary and commission. Answer fully in confidence. Address Box 765, The FOUNDRY, Cleveland.

WANTED

Night turn Superintendent and General Molding Foreman wanted by a prominent electric steel foundry. Address Box 721, The FOUNDRY, Cleveland.

CALIFORNIA—OREGON—WASHINGTON

Leading core oil manufacturer desires representation in the above territory (or any part thereof) by reputable foundry supply house on a consignment or outright purchase basis. Full reply stating territory covered. Address Box 766, The FOUNDRY, Cleveland.

Help Wanted

FOUNDRY SUPERINTENDENT OR FOREMAN

Wanted who is familiar with sandslinger operation. Steel experience preferred but not necessary. To head up extension to present defense plant on repeat work. Good opportunity for man with general foundry knowledge and not at present engaged in defense work to sign up for at least the duration. A good iron man with sandslinger experience should be able to handle this job with the aid of our present organization. Address Box 751, The FOUNDRY, Cleveland.

SALES MANAGER WANTED

A real high grade man with a following and the necessary experience and qualifications to take charge of the core oil department of a highly rated manufacturer. An assured future to the right individual. Replies treated confidential but must state age, nationality, remuneration required and complete history. Address Box 767, The FOUNDRY, Cleveland.

METALLURGIST WANTED

CAPABLE OF OVERSEEING THE PRODUCTION OF STRAIGHT CARBON AND ALLOY STEEL CASTINGS—ACID ELECTRIC FURNACE—STEEL FOUNDRY LOCATED IN EASTERN PENNSYLVANIA.
In reply state age, experience and salary desired. Address Box 704, The FOUNDRY, Cleveland.

COMPETENT FOUNDRYMAN

Wanted for smelter in Peru, South America to take charge of and direct the work of molding and the production of good grade castings from cupola and Bessemer converter. Give full particulars as to experience, etc. in applying. Address Box 768, The FOUNDRY, Cleveland.

FOUNDRY FOREMAN AND SUPERINTENDENT

Experienced on miscellaneous castings in gray iron. Also steel foundryman. Give age, education, salary expected, and experience in detail. Address Box 757, The FOUNDRY, Cleveland.

TIME AND MOTION STUDY ENGINEER

Wanted for foundry located in middle West. Answer stating full qualifications. Address Box 762, The FOUNDRY, Cleveland.

METALLURGIST WANTED BY

Firm in Pennsylvania making electric steel and gray iron castings. Must know how to operate an **acid electric furnace.** Give names of former employers, age, salary expected, and education. Address Box 756, The FOUNDRY, Cleveland.

WANTED

Steel and gray iron moulders
Union Shop
N. & S. FOUNDRY COMPANY
Seattle, Wash.

Positions Wanted

FOUNDRY MANAGER OR SUPERINTENDENT

Practical and technical ferrous and nonferrous foundryman. Practical molder, coremaker, patternmaker, metallurgist. An expert molding machine, core machine and equipment rigger. An expert in cost systems, fluctuant inventory, on metals, cores, molding controls. Full knowledge of sands and facings that will produce high quality castings. Many years' experience training labor in foundry practice. Open for a position on salary and percentage based on big tonnage. Address Box 775, The FOUNDRY, Cleveland.

CLASSIFIED RATES

Position Wanted: 5c per word, minimum $1.50. Help Wanted: 6c per word, minimum $3.00. All other type advertisements: 10c per word, minimum $3.00. Copy should be received not later than 13th of month preceding date of issue. Address: The FOUNDRY, Penton Building, Cleveland.

Positions Wanted

GRAY IRON FOUNDRY SUPERINTENDENT OR GENERAL FOREMAN

Thirty years' foundry experience of which has been superintendent and general foreman for twenty years on jobbing machinery, castings, and practical foundryman in every detail; best reference. New Jersey preferred. Address Box 733, The FOUNDRY, Cleveland.

PRACTICAL, TECHNICAL GRAY IRON FOUNDRYMAN

Age 44, with 23 years' broad experience producing quality castings in general jobbing, machine tool and production; from molder to superintendent. Well versed in both green sand and dry, rigging for molding machines, cupola, cores and working from blue prints. Wants connection with good reliable firm in need of clean cut aggressive foundryman. Address Box 771, The FOUNDRY, Cleveland.

COREROOM FOREMAN

For 15 years in several foundries, large and heavy work, well experienced in sand and castings for armor plate, castings from 2 tons to 40 tons, understands blueprints, heading and gating. Well experienced in handling men. Address Box 769, The FOUNDRY, Cleveland.

EXPERIENCED YOUNG NONFERROUS SUPERINTENDENT

Desires position. Has good background in all phases of shop management and produces good castings of brass, bronze and aluminum. Experience includes pattern and machine shop supervision. Good job estimator. Can train men. Address Box 773, The FOUNDRY, Cleveland.

NONFERROUS FOREMAN

Broad practical experience including steam valves, high pressure castings and general jobbing and production work. Address Box 581, The FOUNDRY, Cleveland.

SALES REPRESENTATIVE

In Detroit area would like to contact foundry and/or machine shop capable of producing machine tool and other castings. Address Box 761, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT

Practical foundryman desires a position. Thirty years' experience handling foundries and men on all classes of work, both heavy and light. Good rigger for production. Best of references furnished. Address Box 734, The FOUNDRY, Cleveland.

NIGHT SHAKEOUT FOREMAN

Experienced on small and large castings; mixes facings and conditions sands. Takes care of core ovens and mixes core sands. Is able to handle help and arrange work. Can take full charge of chipping and cleaning castings, cost and semisteel castings. Address Box 763, The FOUNDRY, Cleveland.

PRACTICAL FOUNDRYMAN

Will act as **sales representative** in New York City and Northern New Jersey area for foundry equipped to make small, medium and heavy gray iron and semisteel castings weighing up to five tons on percentage basis. Production, permanent mold, general jobbing. Address Box 744, The FOUNDRY, Cleveland.

MECHANICAL ENGINEER

Age 36, graduate. Thirteen years' experience in all phases of steel mill and foundry plant engineering and maintenance. Desires position as Plant Engineer with progressive company in East. Now employed. Minimum salary $6000. Address Box 752, The FOUNDRY, Cleveland.

Classified Advertising

Positions Wanted

FOUNDRY FOREMAN

Aggressive foundry foreman desires connection with reliable firm. Fifteen years' practical foundry experience, four years on supervision. Can handle line production, squeezer molding in gray iron, aluminum and bronze. Ability to handle men excellent. Age 35. Address Box 774, The FOUNDRY, Cleveland.

EXPERIENCED FOUNDRYMAN

Offers 20 years' experience in selling and demonstrating supplies, equipment, binders specialty. Moderate salary. No commission. Address Box 758, The FOUNDRY, Cleveland.

Employment Service

SALARIED POSITIONS

$2,500 to $25,000

This advertising service of 32 years' recognized standing negotiates for positions of calibre indicated. Procedure individualized to your personal requirements. Retaining fee protected by refund provision. Identity covered. If salary has been $2,500 or more send for details.

R. W. BIXBY, INC.
101 Delward Bldg. Buffalo, N. Y.

GRAY IRON FOUNDRY EMPLOYMENT

We are receiving many inquiries for superintendents, metallurgists and foremen. We shall be glad to hear from qualified men. No charge.

Gray Iron Founders' Society Inc.
1010 Public Square Building Cleveland, Ohio

Wanted-To-Buy

WE WANT TO PLACE ORDERS

For bronze rods of various specifications, sizes ⅛", 3/16", ¼", ⅜" diameter, length 12" to 18". Foundries having experience in casting rods, write in detail. Address Box 776, The FOUNDRY, Cleveland.

WANTED

One air compressor 200-300 c. f. m., also 25 cycle motor for the same. Sandblast room complete with generator tank, dust collecting unit, helmet, etc. All sizes of steel flasks. Core oven, gas operated. Address Box 755, The FOUNDRY, Cleveland.

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY, Cleveland.

WANTED TO BUY

1300 to 1500 air compressor, or enough compressors to make 1500 ft. air. Also 150 KW 2300—250 V motor generator.

WANTED TANKS

12—10,000 gal. cap. or larger tanks to total 120,000 gal. cap.

RUSSELL STANHOPE,
Darien, Conn.

Wanted-To-Buy

WANTED

Gray iron foundry to produce 60 castings. Weight 17,000 pounds each. Type lathe pan. A-1-a rating. Delivery start October. Pit job of built-up cores. Also want source on 2 ton up to 6 ton machine tool castings with plenty of core work. Address Box 770, The FOUNDRY, Cleveland.

Foundries For Sale

FOR SALE
MANUFACTURING PLANT
24,000 Square Feet Floor Area

PLANT SITE—½ mile N. W. Ashland, Kentucky City limits. 12½ acres.

IMPROVEMENTS.

Office Building—2 story 5 room brick.

Plant Buildings—2 adjoining, heavy structural steel mill type with paving brick and sheet steel walls and siding. Continuous ventilated steel window sash throughout.

One Building—60 ft. x 132 ft.—7920 sq. ft., has heavy load bearing.
Mezzanine floor on 3 sides—4500 sq. ft. floor area.
Crane runway full length of building. 10 ton Toledo 3 motor crane.
Clearances—Bottom crane girders to mill floor—22 feet. Top crane runway to mezzanine floor—8 feet. Mezzanine floor to bottom chord roof truss—12 feet.
Elevator—5 ton electric to mezzanine floor.

One building—43 ft. x 274 ft.—11,782 sq. ft.
Crane runway full length of building. 10 ton Morgan 3 motor crane.
Clearances—Bottom crane girders to mill floor—22 feet. Top crane runway to bottom chord roof truss—8 feet.
Cupola—54" OD iron melting, with Connersville Root blower.

Railway Siding—From main line Chesapeake & Ohio Ry., switch into buildings.

Federal Highways—Location on U. S. No. 23, 2 miles to U. S. 52 & 60.

River Frontage—Available within 1 mile truck or rail haul.

Power—From Kentucky and West Virginia Power Co.—Sub-station adjacent property.

Fuel—Abundant natural gas, coal and coke in this district.

IMMEDIATE OCCUPANCY—Write or Wire

R. R. PEEBLES,
Ashland, Kentucky

FOUNDRY FOR SALE

Gray iron foundry on main line of B. & M. R.R. with side track. Buildings in fair condition and sprinkled throughout. Plot area approximately 40,000 square feet.

GARDNER TRUST COMPANY
GARDNER, MASS.

FOR SALE

Completely equipped foundry and stove factory on railroad siding, now in operation, located in mining town Northern Mexico. Owner wishes to retire to United States. For particulars write to **Mrs. Frances P. Low, Apartado Postal No. 3, Parral, Chih., Mexico.**

For Sale

FOR SALE

P. H. & F. M. Roots Co. blower, model No. 6, serial No. 33324, tag No. 1749, size 20" x 70" gear diam., and case length. Capacity 8000 cu. ft. per min. Capacity to melt 12 to 15 tons per hour. Displacement 38.5 cu. ft. per revolution. Cast iron bed plate. Good operating condition.
General Electric motor, 50 h.p., 1200 r.p.m., 440 volts, 3 phase, 60 cycle. Type KT536, No frame No. model C74, serial No. 4823196, tag No. 11154, 40° C. continuous. Standard open frame, sleeve bearings, ring oiled; good operating condition. Price—$500.00 f.o.b., Fostoria, Ohio.

The Electric Auto Lite Co., Foundry Division, Fostoria, Ohio.

For Sale

FOR SALE

We have a complete stove foundry for sale, flasks, bottom boards, flask jackets, brushes, bellows, shovels, riddles, in other words, complete equipment for a large stove foundry. Also:
Chain Hoists
Air Rammers
Air Drills
Air Grinders
Chipping Hammers.
Air Vibrators, all makes and sizes.
4—Air Hoists, Horizontal Type.
3—Air Hoists, Cylinder Type.
1—800-lb. Worm Gear Ladle.
1—1000-lb. Worm Gear Ladle.
1—1500-lb. Worm Gear Ladle.
1—2 Ton Worm Gear Ladle.
1—3 Ton Worm Gear Ladle.
1—4 Ton Worm Gear Ladle.
2—1000-lb. Bull Ladle with Bail.
25—200-lb. Shank double end and ladles.
6—No. 1 Red Electric Vibrators.
6—No. 5 Red Electric Vibrators.
6—Red Electric Vibrators knee switches.
1—Band Saw.
1—Drill Press.
1—SP Clarage Fan No. 70 Exhaust.
1—Disc Grinder double wheel 24" dia.
1—Sand Cutter.
1—No. 0 Cupola.
1—48" Cupola.
1—Core Oven, 5 tray, coke fired or gas, 36" wide, 51" high, 31" deep, shelves pull out.
1—Core Oven, gas or oil, 30" wide, 48" deep, 42" high, inside measurements, insulated walls, doors at both ends, thermostat.
1—Ingersoll-Rand Air Compressor, 10 x 10.
1—Gardner Air Compressor, 6 x 6, belt driven with Lincoln motor.
12—Brillion Iron Pouring devices.
1—6 x 6 Curtis Air Hoist.
1—Sand Blast Barrel Model A.
1—20 x 20 Tilting Sand Blast No. 0.
1—Tumblast.
1—New Haven Sand Blast Barrel 30 x 40.
2—Grinders, motor driven.
3—Grinding Wheel Stands with motors.
1—Stock Core Machine.
4—Core Racks.
1—3 cu. ft. Blystone Mixer with motor.
2—Water Tumblers.
1—Dust Arrestor.
300 ft. Richard Wilcox Monorail curves, switches trolleys.
2—Power Sprue Cutters.
2—Fisher Furnaces, complete.
1—Monarch tilting Furnace complete.
2—Champion Core Machines.
2—24 x 48 Campbell-Hausfeld open flame furnaces, comp.
1—Royer.
2—Oil Starting Switches.
2—Sand Blast Generators.
2—32 x 32 x 48 Sly tumbling barrels.
2—36 x 36 x 60 Whiting tumbling barrels.
2—24 x 48 tumbling barrels in one unit.
1—24 x 48 tumbling barrel.
2—24 x 42 Cleveland Nichols tumbling barrels in one unit, back to back.

INTERNATIONAL MOLDING MACHINES
1—type "JW" 14 x 22 x 8" draw.
2—type "JW" 12 x 22 x 4" draw.
1—type "R" 24 x 10 hand operated.
1—type "R" 20 x 8.
1—type "JW" 20 x 22, 8" draw jolt stripper.
12—type "JS 2" jolt squeezers.
2—type "R" 14 x 8.

MILWAUKEE MACHINES
1—Jolt stripper squeezer.
1—Jolt squeezer plain.
2—Jolt squeezer.
3 and 4 ton Electric Hoists, floor operated, 1 Northern, 1 Sprague.
Rebuilt motors, all sizes which are guaranteed.
Blowers and exhaust fans.
Hines aluminum flasks all sizes.
Core Plates—cast iron, steel, aluminum and composition, all sizes.
Steel flasks, all sizes.

OSBORN MACHINES
32—"J75" jolt squeezers.
1—"J74" plain squeeze.

TABOR MACHINES
1—Jolt Squeezer.
2—Jolt Strippers.

HERMAN MACHINES
Jolt Rollover Machines.

HAYNES FOUNDRY EQUIPMENT COMPANY
1734 Lake Street, Kalamazoo, Michigan

FOR SALE

(1) 3-ton Heroult furnace complete except for controls and transformer.
(2) 1000 lb. Detroit rocking type electric furnace complete with 300 KVA 4600 volt transformer and panel board.
Address Box 671, The FOUNDRY, Cleveland.

Classified Advertising

For Sale

REBUILT COMPRESSORS AND BLOWERS

1250 CFM, @ 3¼ lbs., 3600 RPM Gen. Elec. with 30 H.P. A.C. motor drive.

(3) Buffalo Forge Pressure Blowers, 1200 cfm @ 11 oz., 9½" inlet, 7 x 7 outlet, driven by 7½ H.P. A.C. Motors.

450 CFM, 3500 RPM Gen. Elec. with 6.2 H.P. A.C. motor drive.

SAND VIBRATOR

Jeffery-Traylor, shaker type CVS-8, 6" wide hand deck, capacity 7 to 8 tons sand per hour; with 15 cycle, 110 volt, single phase vibrator motor generator set. Write, wire or phone.

The Motor Repair & Mfg. Co.
1552 Hamilton Ave. Cleveland, Ohio

FOR SALE

Twenty-two inch Barret cupola and complete equipment. Located in Indiana. Address Box 772, The FOUNDRY, Cleveland.

FOR SALE

Seven coke type Walker-York crucible furnaces. Used two months. Excellent condition, reasonable price. Full details on request. **Schaible Foundry & Brass Works, 1090 Summer Street, Cincinnati, Ohio.**

EQUIPMENT IN STOCK
GUARANTEED IMMEDIATE SHIPMENT
MOLDING MACHINES

(1)—No. 8¹ Osborn Jolt Squeeze Stripper.
(1)—20" Tabor Jarr Rollover.
(2)—Herman Jarr Table 40" x 60".
(2)—Herman Jarr Strippers Tables 40" x 60".

MISCELLANEOUS ITEMS

(1)—Young Bros. Gas Fired Core Oven, 12' 6" deep, x 8' wide x 7' 6" high, double doors one end, 4" insulation complete with burner, flues and pyrometer.
(1)—Coleman Junior No. 2 Core Oven 5-drawers, 42" wide, height 6" and 7".
(1)—1¾" Cap. Shuster Power Sprue Cutter.
(4)—Large Flask Vibrators.
(1)—10-HP. Black & Decker double end, 230-VDC. Grinder, capacity 24" wheels.

AIR COMPRESSORS & BLOWERS

(1)—12 x 12 Chicago N.S.B. 375-CFM. @ 100 lbs. with idler, unloader and lubricator.
(1)—12 x 10 Penna., 365-CFM. @ 100 lbs., belt drive, 60 HP. C.W. slip ring motor, 220/3/60-cycles.
(1)—2-stage Ing. Rand size 16 & 10½ x 12, cap. 770-CFM. @ 75 lbs. direct connected to a 125-HP. G.E. Syn. Motor, 2300/3/60-cycle, exciter, control, after cooler and tank.
(1)—No. 4 Wil. Green Positive Pressure cap. 13-cu. ft. per rev.
(1)—Spencer Turbo Blower, 1300-CFM. @ 16-oz. 10-HP. motor, 220/3/60-cy., 1760-RPM.

SAND HANDLING EQUIPMENT

(1)—Link Belt 24" x 55" hopper type, Core Buster used with belt conveyor.
(1)—Link Belt Vibrating Screen 22½" x 50" used with belt conveyor shake out system.

MELTING EQUIPMENT

(3)—350-lbs. and 1000 lbs. Detroit Furnace complete with all Elec. Equipt. 2300 and 4600-volts transformer.
(2)—3500 lb., 6000 lb. Ladles, worm geared, crane type bail (excellent condition).

ELECTRIC MONORAIL HOISTS

(30)—½ to 5-ton, 1 and 2 motor, Fl. and Cage operated, 220/440-volts, 3-PH. 60-CY. 110 and 230-VDC.

OVERHEAD ELECTRIC TRAVELING CRANES

1 to 50-ton Cap. 18' 0" to 91' 0" span, 220/440-volts, A.C. and 230-VDC. We operate the largest crane Rebuilding Plant in the country. Send us your specifications for Cranes, Electric Monorail Hoists, Crane Motors, Standard Motors, Steel Buildings and Runways. We can quote you on equipment rebuilt to your specifications.

ELECTRIC FURNACE: 6-ton, Heroult complete with all electrode motors, tilting motor, electrical equipment and (1)—1500-KVA and (1)—800-KVA, G.E. transformer 13200/3/60-cycle on primary, control equipment, panel etc.

T. B. MacCABE CO.
4304 Clarissa St., Philadelphia, Pa.

For Sale

FOR SALE

1—No. 42 Newton cupola with Sturtevant blower.
1—Mott Sandblast machine.
1—U. S. Electric grinder stand direct driven 5 h.p. motor with 2—3" x 24" emery wheels.
1—No. 24 Davenport combination jolt roll-over and draw molding machine.
1—Blystone core sand mixing machine with motor.
1—20" x 40½" tumbling mill—"V" belts and motor.
1—42" x 48" tumbling mill—belt driven.

Illinois Pipe & Manufacturing Co., 4529 Ogden Ave., Chicago, Illinois.

REBUILT USED EQUIPMENT

Molding machines, all types; tumbling mills; furnaces; cupolas; air compressors; hoists; rammers, all types; ladles, all types; sand mixers; sand blast tanks; core machines, etc. All equipment rebuilt and guaranteed. All sizes used steel flasks.

HAYNES FOUNDRY EQUIPMENT COMPANY
1734 Lake St. Kalamazoo, Mich.

FOR SALE

36" x 10' rotary dryer with drive and equipped with a size 25 Buffalo type E mill exhauster driven by a Reeves variable speed transmission directly connected to a Westinghouse 2 h.p. 3 phase 220-440 volt motor. Equipment includes a higher pressure gas burner and duct from the dryer to the exhaust fan and about 30 ft. of stack; capacity of the dryer 6 to 10 tons per hour. Address Box 753, The FOUNDRY, Cleveland.

CORE SAND DRYER
No Priority Needed!

Rockwell rotary dryer, 18" diameter inside the brick, 12' long. Complete with base, reducer and burner. Lined with brick—all ready to go—$500.00. **The Federal Foundry Supply Company, 4600 East 71st Street, Cleveland, Ohio.**

AIR COMPRESSORS

BELTED—176 ft., 355 ft., 540 ft., 676 ft., 752 ft. & 1300 ft.

ELECTRIC—355 ft., 528 ft., 676 ft., 807 ft., 1302 ft., 1723 ft., 2022 ft., 2200 ft., 2800 ft., 3600 ft., & 5000 ft.

STEAM—368 ft., 500 ft., 800 ft., 1221 ft., 1640 ft., 2200 ft., & 3000 ft.

DIESEL—368 ft., 603 ft., 900 ft. & 1300 ft.

GASOLINE—110, 160, 220, 310, 1300 ft.

R. C. STANHOPE, INC.
60 East 42nd St. New York, N. Y.

REBUILT
BLOWERS—FANS—EXHAUSTERS

Roots-Connersville positive cupola blowers. Centrifugal blowers for gas and oil burning. Sand blast, grinder and dust exhausters. Ventilating fans.

GENERAL BLOWER COMPANY
406 N. Peoria St. Chicago, Illinois

For Sale

FOR SALE

60 sets mall. flasks, 13 x 18—4" C. & D.
5-175 lb. aluminum gas fired furnaces
1—Type "K"-84" American sand cutter, Buda motor
1—20" Davenport jolt stripper
2—16" x 5" draw hand rollovers
3—22" x 8" draw hand rollovers
1—24" International type "R" rollover
2—No. 112 Milwaukee jolt squeeze strip
3—No. 11-32 Nichols jolt squeeze strip
4—Arcade "Modern" squeezers
31—Hand strippers, round or square

CHAMPION FOUNDRY & MACHINE CO.
1314 West 21st St. Chicago, Ill.

FOR SALE

One No. 6 Piqua positive pressure blower, 20" x 60"—35 ft. displ. top discharge, mounted on bed-plate direct connected to 40 h.p. Wagner 3/60/220 A. C. motor, with starter . . . used. Address Box 760, The FOUNDRY, Cleveland.

FOR SALE

1—New Whiting cupola, 66 inches, never used.
1—Sly dust collector, used. Good condition. Will sell together or separately. Sacrifice. Address Box 754, The FOUNDRY, Cleveland.

SPECIAL DEFENSE BARGAINS

Air Receivers up to 36" dia.
60" Cupola stack sections only, 72" cupola.
Air Compressor Unit—8½ x 12 Worthington Vee Belt drive with receiver, starter unloader etc. complete unit. 40 HP 3-60-220 motor.
Fans—Blowers—Exhausters for cooling, ventilation and dust or fumes removal. Multivane Fans in all st'd. makes and styles for large air volumes at low pressures.
Fan or **Centrifugal** style blowers—Maxon-Premix—from No. 1 to No. 6, Spencer Turbine, Am. Blower Co., Sturtevant, Buffalo, Clarage, Ilg etc. for Gas or Oil fuel Combustion.
Rotary Pressure Blowers — Roots-Connersville, Garden City, Green, Piqua, Sturtevant, Am. Gas Furnace Co. etc. Send specifications.
Furnaces for Brass and Aluminum Melting—Hausfeld Tilting open flame 400 lb. brass cap.; Booth Electric 725 lb. brass cap. with instruments. Stationary Furnaces, swing top for crucibles No. 60 to No. 150 and open top for iron pots up to 300 lb. aluminum.
Schwartz Furnaces—42". Class A unlined.
Molding Machines—Osborn No. 404-S, Pit Type jolt-stripper. "Berkshire" 34" wide stationary air squeeze. "Tabor" 8" cyl. air squeeze. "Battenfeld" (Johnston & Jennings) stationary jolt squeeze; 5 in stock. Adams—Stationary hand squeezers 48" wide 2 in stock. Mumford—Stationary Air Squeeze 14 x 18" platen. Tabor—Hand operated, portable, Rollover, draw for 24" x 30" flasks or core boxes, 3 in stock.
1—Crane Ladle 4 tons capacity.
1—25 H.P. Diesel Engine, horizontal.
1—Whiting style, 36" x 60" Round Tumbling mill.
Sand Blasts—pressure generator tanks with hose & nozzles. Sly wet Cinder mill.
Sand Blast Barrel—New Haven 36 x 46" for Motor direct connected without motor.
Sand Blast Table—Pangborn 8' dia. with operators room and pressure generator tank.
Grinder Stands—Belt driven.

Tell us your needs.

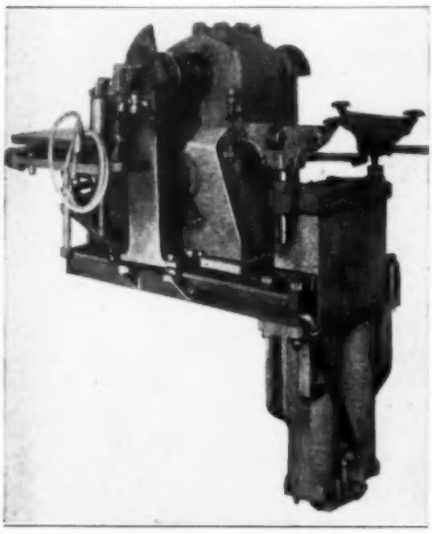
CLIFTON MACHINERY CO.
1023 W. 6th CINCINNATI, O.

"SCULLY-JONES" RECONDITIONED FOUNDRY EQUIPMENT

♦ Ready for immediate shipment, this equipment has been completely rebuilt in our modern machine shop. Prices on request.

INTERNATIONAL MOLDING MACHINES

1 49 x 16" draw Type "F," fitted with air equalizers, rollers in the draw section and hand operated core box clamps, jar plate 100" long, 6000 lbs. cap.



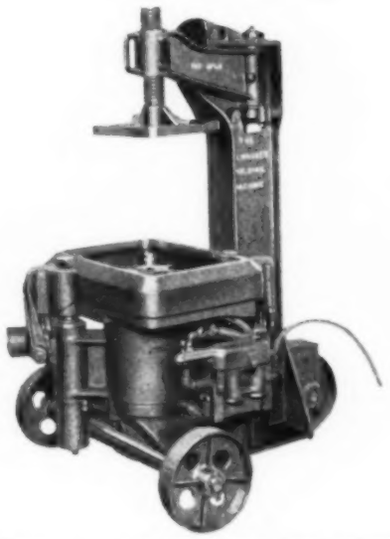
INTERNATIONAL TYPE "F"
(Enclosed Model)

48 x 16" draw Type "F"—4200 lbs. cap. @ 80 lbs., table size 48 x 83".
36 x 16" Type "F" (double cyl. open type) 3000 lbs. cap. @ 80 lbs. press. 36 x 48" table.
31 x 16" Type "F" late type enclosed cyl. machine, 28 x 52" roll-over table, 2500 lbs. capacity.

JOLT SQUEEZERS

No. 75-J Osborn portable, 36", 16 x 20" table, 10" dia. cyl.
Nicholls Type 10-F stationary, with swing-head, 15 x 16" table.

MILWAUKEE MOLDING MACHINES

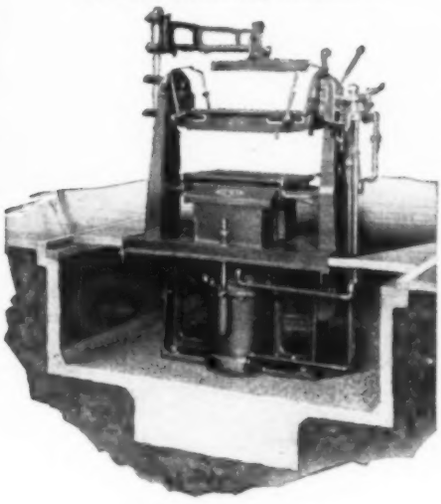


Milwaukee No. 113 Jolt Squeeze Strip, portable, 500 lbs. cap. @ 80 lbs. press., 6" pattern draw, 16 x 26" table, jolt cyl. 5"—squeeze cyl. 11".
Milwaukee No. 113, same as above, excepting open end type, instead of closed end.

JOLT SQUEEZE & STRIP POWER

No. 142 Milwaukee, stationary, stripping cap. 1200 lbs. @ 80 lbs. press., draw 6" table 19 x 35"—open end type.
No. 703-6 Osborn jolt squeeze and strip, 21 x 28" table, stationary, length of opening in lifting frame 34", 6" pattern draw, 8" cyl. dia. 1000 lbs. jolt. cap. @ 80 lbs. pressure, distance from lifting frame to squeeze head 24¼", flask length 44½", with roll off conveyor.
No. 703-5 Osborn, same as above excepting 17 x 35" table.

OSBORN Molding Machines



No. 332, jolt roll-over and squeeze with roller conveyor attachment, flask cap., max. length 36" width 26" pattern draw 9"—750 lbs. cap. @ 80 lbs.
No. 333, flask cap. max. length 45" width 32"—pattern draw 11", 1400 lbs. cap. @ 80 lbs. press. squeeze cyl. dia. 19".

No. 513-E Osborn Air Jolt and Electric Roll-Over, pattern draw and Run-Out Car, flask length O/A 124" width 72" capacity, width of roll-over table 60"—pattern draw 30"—cap. @ 80 lbs. pressure 12,000 lbs. with 15 HP Motor.

MISC. MOLDING MACHINES

No. 403-W Osborn jolt roll-over and pattern draw, flask cap. 52 x 36", 12" draw, with swing-out Mold Table, Power Roll-Over.
No. 24 Davenport jolt roll-over draw, stationary, table 24 x 38", 10" draw, 1000 lbs. cap. @ 80 lbs. press.
Tabor 24" hand ram, power roll-over and hand draw, portable, 20 x 30" table, 9" draw, 500 lbs. cap. @ 80 lbs.

SPENCER TURBO COMPRESSOR BLOWER

Spencer-Turbo-Comp. Blower, No. 1507, 675 CFPM @ 24 oz. pressure, 12" opening, direct connected to 7½ HP Westinghouse 3-60-220V AC 1750 RPM Motor.
Spencer-Turbo Comp. Blower, No. 1510, 900 CFPM @ 24 oz. pressure, 12" opening, direct connected to 10 HP Westinghouse 3-60-220V AC 1750 RPM Induction Motor.

BUCKETS

½ yd. P & H Single Line Grab Bucket, 1 yd. Brosius Single Line Grab Bucket.
1½ yd. 230V DC Elec. Bucket, cap. 8000 lbs.

LOT 34" dia. x 74" length WHITING Exhaust Tumblers, door opening entire length of barrel, renewable trunnions.

B & P MOTIVE TYPE SANDSLINGER 3 ft. track gauge, ramming cap. 7-10 cu. ft.-11 ft. jib, 4 ft. ramming unit, ramming arm can be electrically raised or lowered, as desired, with Hopper—220V AC Motors.

OVERHEAD ELECTRIC TRAVELING CRANES

35-ton Morgan approx. 35 ft. span Power House Type 4-motors, 600V DC Motors with Aux. Hoist, chain on main drum.
25-ton Walker 55 ft. span with 5-ton Aux. 550V DC Motors, girders single web const. truck ends with large steel wheels, chain on main drum, 3-motors.
5-ton Armington 26' 6" span, 2-motor type, 220V AC Motors, floor operated, 18" "I" Beams, trolley hand racked.
5-ton Shepard Class "B" 18'5" span, 1-motor, floor control, 6 HP 220V DC, trolley hand racked, bridge hand racked.
2-ton Detroit Ice House Type, 26 ft. span, "I" Beam Bridge Type Girders, 3-motors, 3/60/220V AC, floor oper. 10 ft. lift.

ELECTRIC HOISTS

1000 lb. Shepard equipped with 2HP 220V AC Motor, floor control.
1-ton Shepard Lift-A-Bout equipped with Trolley, 2¼ HP Zobell 110V DC Motor, floor oper., 18 ft. lift.
1-ton Shepard Lift-A-Bout equipped with Cleveland Electric Tramrail Trolley, 3 HP 220V AC, floor cont. 15 ft. lift.
2-ton American Engr Type NB-2, equipped with 2¾ HP DC Motor, 15 ft. lift, floor cont.
3-ton Detroit Top Hook, with Watson 5 HP 230V DC Motor, 12 ft. lift.
5-ton Detroit Top Hook, floor cont. with 6½ HP 230V DC Motor.

SANDCUTTER

Cleveland Model "B" Type 5-55, 55" circular cutting cyl. 26" dia. distance between tractor wheels 66" equipped with 3—Cleveland Elec. 220V AC Motors.

LADLES

CRANE LADLES with "V" Bail
10-ton Whiting.
5-ton Whiting.
3-ton Whiting.

Dings inclinable BELT CONVEYOR 125V, speed 40-50, Type H, 3/60/220V AC, 10 ft. centers, 12 x 20" MAGNETIC PULLEY complete with FEED HOPPER and Speed Reducer.

Above items represent but a portion of our used or reconditioned FOUNDRY and INDUSTRIAL EQUIPMENT BARGAINS . . . Send for our current STOCK LIST No. 69 which shows COMPLETE STOCK on hand at our CHICAGO WAREHOUSE and advise as to your exact requirements.

SCULLY-JONES & COMPANY (Foundry Division) 2031 W. 74th ST.
PHONE PROSPECT 8770 — CHICAGO, ILLINOIS

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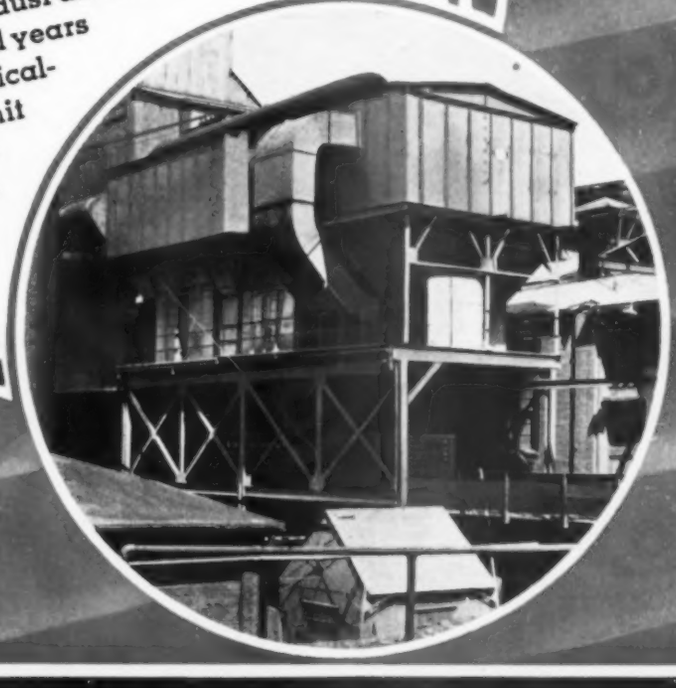
Parsons

OVAL BAG DUST ARRESTORS for Today's Production and TOMORROW'S COMPETITION

◆ Parsons Oval Bag dust arrestors are an "absolute essential" for today's tremendous production program and for what is coming in the future tomorrow's keen competition. ◆ Once Parsons Oval Bag dust arrestors are installed you get immediate increase in production and what is also extremely important protection for your employees, machinery and plant. ◆ Parsons Oval Bag dust arrestors will clean and dispose of dust and dirt in any plant quickly, thoroughly and economically. In many instances it's the dust and dirt you can't see floating around in the air that is the most destructive. ◆ Parsons Oval Bag dust arrestors are engineered and built for years and years of trouble free operation and in practically every Parsons installation the unit has paid for itself in no time and then went on to earn dividends.



Write today for the new free bulletin "Mastery of the Air."

PARSONS *Engineering* CORP.

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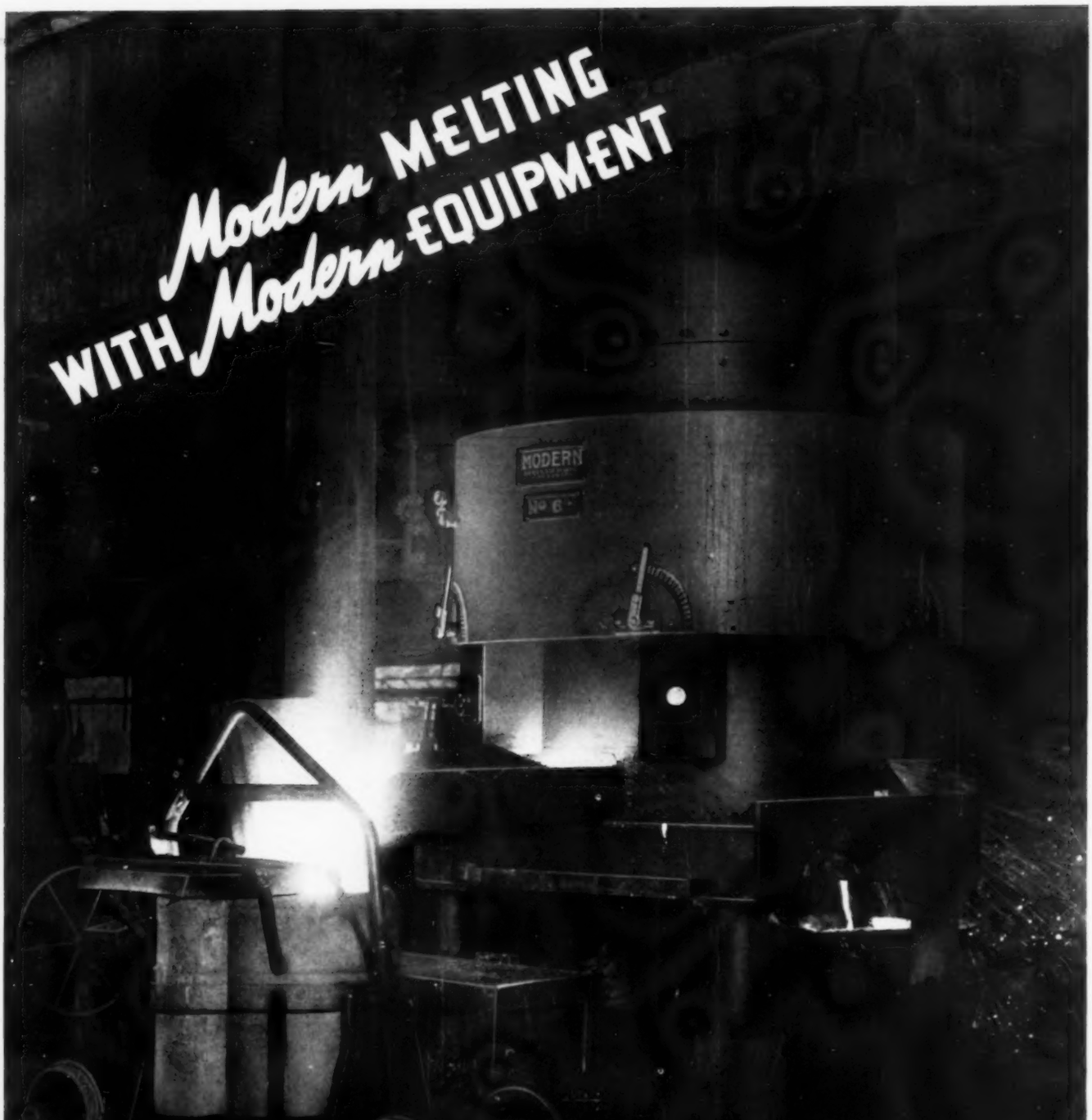

Ideal for High Percentage Steel Melt!

MODERN Products for Production

CUPOLAS
CUPOLA CHARGERS

MODERN EQUIPMENT COMPANY

PORT WASHINGTON, WIS., DEPT. 193

Lifetime Geared Ladles
Improved Bottom Pour Ladles
Metal Pouring Systems

Crane & Monorail Systems for Metal & Mold Handling
Furnace Charging Cranes

MODERN EQUIPMENT CO.
PORT WASHINGTON, WIS.

RESPONSIBILITY

☆ ☆ ☆ ☆ *We conceive it to be our responsibility to supply "Everything for a Foundry" and our duty to furnish helpful information on all products that save materials, save time, speed production.*

☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆

PRODUCT INFORMATION—AN AID TO PRODUCTION

Stop Veining

☆

Stevens No. 90 Iron Oxide

☆

Use: In cores for iron and steel.

Object: To stop veining and metal penetration.

Action: Increases the *hot strength* of cores.

Result: Cleaner castings; reduction in cleaning costs.

Core cracking, spalling and collapsing too rapidly are caused by cores of too low hot strength. To avoid this condition, do not increase core cold strength, but increase the hot strength. This provides the additional core strength without disturbing any other factors.

A core with 5 pounds hot strength can be raised to 25 pounds by adding 2% of iron oxide to the core sand mix.

Use Stevens Iron Oxide because it contains 90% iron oxide and only a trace of calcium.

Prevent Metal Seepage

☆

Stevens
No. 125 Core and Mold Wash

☆

Use: On cores and molds for bronze castings.

Object: Prevents metal seeping into the sand.

Action: Seals core and mold surfaces.

Result: Castings are free from seepage fins.

An especially developed core and mold wash for *bronze* castings that stops metal seeping into the sand. It is particularly applicable for the high lead and phosphor bronzes, which are thin and "searching". Highly refractory, this wash seals core and mold surfaces. Metal lies quietly, reducing turbulence.

Stevens No. 125 Core and Mold Wash produces an exceptionally smooth finish. Little cleaning is required as the castings are free from seepage fins and scabs. Rejects are reduced to a minimum.

Reduce Chill Hardness

☆

Stevens Grain Size Graphite
No. 10 Mesh Mexican

☆

Use: A Graphitizer

Object: Reduces depth of chill and surface hardness.

Action: Induces graphitization.

Result: Improves machinability.

Stevens Grain Size Graphite stimulates graphitization of the iron reducing surface hardness and depth of chill. It effects a more uniform distribution of small graphitic carbon particles. These two factors combine to produce castings that are more easily machined.

In gray iron foundries, Stevens Grain Size Graphite—2 to 5 pounds per ton of metal—may be added at the spout, in the ladle or in the furnace; in steel foundries, it is added either at the spout or in the ladle.

Ask our representative about these products or place a trial order

FREDERIC B. STEVENS, INC.

Detroit, Michigan

- NEW ENGLAND . . . . . 166-182 Brewery St., New Haven, Conn.
- NEW YORK and PENNSYLVANIA . . 93 Stone St., Buffalo, N. Y.
- INDIANA . Hoosier Supply Co., 36 S. Cruse St., Indianapolis, Ind.
- CANADA . . . Frederic B. Stevens of Canada, Limited
- 1262 McDougall St. . . . . Windsor, Ontario
- 2368 Dundas St. West . . . . . Toronto, Ontario

GETTING "SOFT" ... EH?

"BEWARE of an America aroused!"

Sure we've been rolling on rubber—eating our sirloin steaks—lolling in the luxuries which only free Americans have the God-given genius to create, and the capacity to enjoy. But we can still take it, and we can still dish it out.

The world knows now that this "love of luxury" is just a thin outer garment, easily whipped off in an emergency—and that, underneath it, there are muscles of steel.

Sacrifice? We will sacrifice anything but our Liberty!

Suffering? We still remember about Valley Forge, and the blood of our fathers on the snow!

Death? Better death, any day, than life without freedom!

So they said we'd rather lose a war than lose an election? And those cracks, dividing us, were deep craters—not just surface scratches? Management wouldn't work with men, and men wouldn't work with management? And we couldn't get going *fast enough* to become a real factor in this war?

What a jolt the Axis is in for! You might just as well try to sweep the tide back with a broom as try to buck American machines, driven by free, skilled American workers.

◆ ◆ ◆

Inspired by the job our own workers are doing, we view this crisis, not with alarm—but with confidence. Every lathe, every drill, every tool in our plants has been turned into a weapon of war—every worker, man or woman, into a PRODUCTIONEER—a soldier in overalls. Such spirit, such skill, such strength cannot lose—for these men and women are fighting *with their hearts*, as well as with their heads and their hands—fighting, along with the millions of other patriotic workers throughout all America—to STAY FREE!

LINK-BELT COMPANY—INDIANAPOLIS—PHILADELPHIA—CHICAGO—ATLANTA—DALLAS—SAN FRANCISCO—CEDAR RAPIDS
THE LEADING MANUFACTURER OF EQUIPMENT FOR HANDLING MATERIALS AND TRANSMITTING POWER

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